August 1985

FISH RIVER BASIN
ENVIRONMENTAL RECONNAISSANCE STUDY

Prepared for:
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
424 Trapelo Road
Waltham, MA 02254-9149

Prepared by:
HMM Associates, Inc.
336 Baker Avenue
Concord, MA 01742

CONTRACT No. DACW33-85-D-0001

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TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

This environmental reconnaissance report provides a general description of the existing natural resources within the Fish River Basin. This study includes an overview of the land features of the basin, its historic, current and projected land uses, and terrestrial and aquatic ecosystems.

The Fish River is part of the St. John River system. The overall basin encompasses a drainage area of over 21,000 square miles across Aroostook County in northern Maine into New Brunswick, Canada, and empties into the Bay of Fundy. The Fish River is a major tributary to this system.

The Fish River Basin (see Figure 1-1) includes a drainage area of 892 square miles, and accounts for four percent of the St. John River system. The Fish is 63 miles in length from its origin at the confluence of several streams upstream from the Fish River Lake in T 13 R 8 WELS, Maine to its confluence with the St. John River in Fort Kent, Maine. The project area includes all of the Fish River Basin (NERBC, 1981a and b; NERBC, 1975; Corps, 1977b; and Corps, 1981).

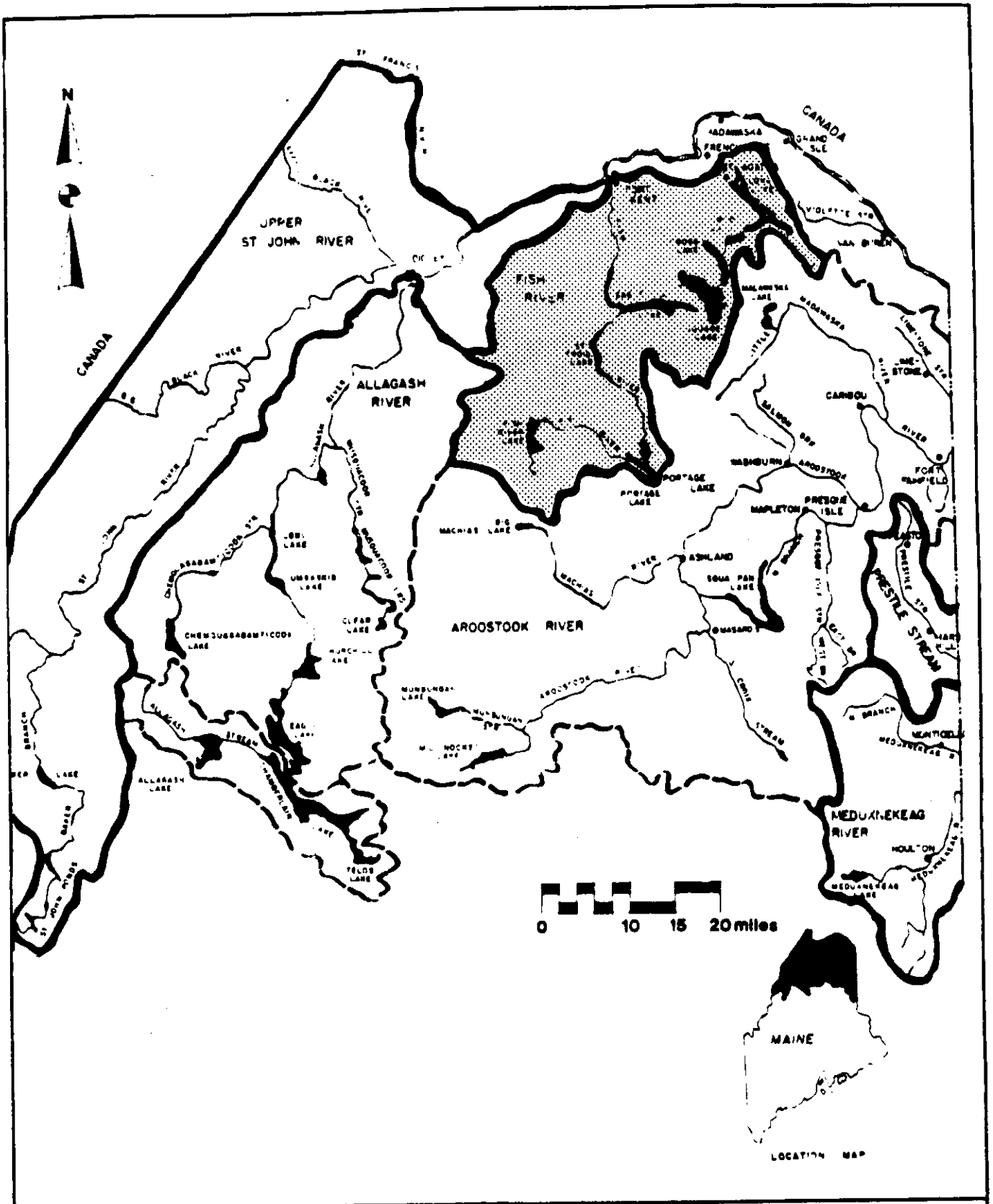


FIGURE 1.0-1 FISH RIVER BASIN
(Adapted from NERBC, 1975)

2.0 TOPOGRAPHY AND GEOLOGY

2.1 Topography and Geology

The Fish River Basin study area has a fairly consistent topography. It is an area of low relief modified by glaciation. At the headwaters area, plains, wetlands and swamps are the predominant characteristics. The relief is constant following the river, but increases to the west. This river basin has many lakes and is heavily forested (NERBC, 1977).

There has been only limited geological research done of the Fish River Basin. There are many monadnocks formed by igneous masses, which are unlikely to erode. Most rock is metamorphic and igneous. The whole area is till consisting of silt, sand, clay and gravel. Towards the southern portion of the river basin the soil has a higher clay and sand content which enhances agricultural potential (NMRPC, 1976b).

2.2 Soils

The Fish River Basin is largely filled with soil made up of calcareous shales. The soils lie over a layer of slate, a dense fine-grained rock that splits into thin layers, and acid shale which is formed of densely packed clay, mud or silt that also splits into layers. Soil erosion is a problem in this area (NERBC, 1977a).

2.3 Significant Natural Features

As part of the Critical Areas Programs (see Appendix A) the State Office of Planning has identified natural features of concern. Glacial, hydrologic and bedrock features are present in the project area. Glacial features such as Eskers, and Moraines are found throughout the basin. Three hydrologic features, the Fish River Falls located in Fort Kent, Smith Brook Falls Gorge located in Township 13, Range 8, and Red River Falls Gorge located in Township 14, Range 8 are considered significant natural features. An important bedrock feature, which is one of the ten largest copper-zinc deposits in North America, may be found in Township 12, Range 8 at Bald Mountain (ME, 1985g).

3.0 LAND USE

3.1 Historic Overview

Excluding the Fort Kent area, the population has decreased in most of the towns in the Fish River Basin. The decline was primarily caused by a loss of agricultural employment in the 1960s. The area has been and is still dependent on the potato market for economic stability (NMRPC, 1977b).

3.2 Current Uses

Existing land uses in the basin area have been studied by various organizations such as the Northern Maine Regional Planning Commission, the New England River Basin Commission, and the State of Maine Land Use Regulation Commission (NMRPC, 1977b; NERBC 1981b; ME, 1985). Land use data was collected from a number of different sources, including: land use maps, zoning maps, recreational maps, and regional publications. These resources indicate that there are eight predominant land use categories present in the project area:

1. Timber Land
2. Industrial Land
3. Commercial Land
4. Water Resource Land
5. Mineral Mining Land
6. Agriculture Land
7. Recreation Land
8. Public Land.

3.2.1 Land Use Categories, Relative Area and Distribution

The following list of the land use categories for the Fish River Basin area is a modification of a previously published list (NMRPC, 1977b). Below, the aforementioned eight categories are discussed in relation to their relative area and distribution percentage for the Fish River Basin. The Land Use Regulation Commission, the Northern Maine Regional Planning Commission, and various other state agencies have provided the necessary information to elaborate on these categories. The Land Use Regulation Commission has developed extensive land use maps for the general project area (ME, 1981, 1984).

- Timber Land - Areas utilized for the growth, management and harvesting of trees for a controlled and sustained yield of timber products (NMRPC, 1980b). More than half of the study area is forested. The most heavily forested area is in the Fish River Lakes Region and it is also the most remote area (NMRPC, 1977a).

- Industrial Land - Heavy industry of timber products, and the potential of a potato processing plant in Fort Kent (NMRPC, 1980b). The timber industry is owned primarily by industrial owners and it is focused around the Fort Kent area. The potato processing industry is a small percent of the study area's industrial data, with its distribution only in the Fort Kent area (NMRPC, 1977a).

- Commercial Land - Marketing of the potato crop, stores, river-guide services (NMRPC, 1980b). The study area is supported commercially by timber products and potato marketing. The introduction of North Maine Woods, Inc. has become known as the primary commercial source for recreational use of the Northern Maine woodlands. Fort Kent is the most active commercial and largest population center in the basin (ME, 1983).

- Water Resource Land - A valued resource for water supply, fish and wildlife requirements, industry, and recreational use within the project area includes the Fish River, surrounding lakes and ponds, and ground water (ME, 1983). Water is a very accessible and available resource. A major percent of it is used by the wet processing industry. In the populated area of Fort Kent, treatment facilities will be used in the future to preserve this resource (NMRPC, 1976b).

- Mineral Mining Land - Available land that is source for productive use of mineral resources within the project area this includes, sand, gravel, stone and copper-zinc (ME, 1983). Mineral extraction is restricted to areas of central Northern Maine, within the Fish River Basin (e.g., T16 R8, T15 R8 and T14 R9), (NMRPC, 1977a).

- Agriculture Land - Maintained for the potential increase of productivity for the production of forage, grains, and other crops including: cropland, abandoned fields, small farms (NMRPC, 1980b). There was a 30 percent loss of farms in Aroostook County between 1967 and 1977. Most of these farms are outside of the study area. Potatoes are the most valuable crop with peas, oats, and hay tied for second place in crop yield. Potatoes cover approximately 112,000 acres, followed by oats at 47,000 acres, then hay at 20,400 acres and finally peas at 6,150 acres. A small percent of land is abandoned, not suitable for crop production because it is too wet (NMRPC, 1977a). Generally, the Fish River Basin is not considered an agricultural area; however, there is some agricultural production in the Fort Kent area.

- Recreation Land - That which provides a variety of recreational opportunities, preserving the natural environment. Hunting, canoeing, fishing and camping in that order of pressure (ME, 1983). The study area is generally remote. The Fish Lakes Region is a heavy pressure recreation area.

  More than half of the canoeists are non-residents who travel great distances to get here. The most frequented areas are the Fish River Lakes.

  Hunting is the most important recreational activity in this area both for sport and food. More than half of the yearly hunters are non-residents.

  The largest percent of anglers on the other hand is Aroostook County residents, followed by non-residents from out-of-state, then Maine residents. The Fish River Lakes Region is a high pressure area for fishing.

  Camping is dominated by Maine residents by a marginal amount. Access is difficult within the project area but has been faciliated by the old logging road system. Despite the remoteness of the Fish River Basin area, many people are able to enjoy it to great extremes (Corps, 1977c).

- Public Land - Areas set aside for public use, maintained and regulated by North Maine Woods, Inc., a group of private landowners and governmental agencies, and by the State of Maine which controls the unorganized townships. Each visitor must check in and out at one of the checkpoints on each visit. Trucks have the right of way on the old logging roads. Fires are only allowed in designated fire rings, or a fire permit must be obtained. Reserved camping only (NMW, 1985). North Maine Woods, Inc. controls most of the public land in Northern Maine, which includes the Fish River Basin area. North Maine Woods, Inc. covers a multiple ownership area under multiple use management. It is responsible for organized recreational use of two and a half million acres of commercial forest land in northwest Maine which includes the study area.

  The Bureau of Public Lands is also a multiple use land management agency. It is responsible for the administration of 400,000 acres of Public Reserved Land in the State of Maine, considerably less compared to North Maine Woods, Inc. The lands have many different resource values; timber production, recreation, and wildlife. The Gardner-Deboulie Management Unit, which is located in the study area in Township 15, Range 9 WELS, is classified as a

Public Land. It encompasses 20,000 acres of mountains, wilderness lakes, and hiking trails. Access to this unit and its primitive campsites is out of Portage.

Recreation is geared toward primitive types of outdoor activities; camping, fishing, hunting, canoeing, and hiking. There are no state parks in the Fish River Basin area. In the adjacent Allagash River Basin the Allagash Wilderness Waterway State Park is located. It is a vast commercial forest which encases 92 miles of lakes and rivers (ME, 1985).

3.3 Projected Trends

The remote areas of the study area will probably not be affected in the future by growth. There are no projected plans for increased population numbers or outstanding use of the wilderness areas. However, with surrounding growth projections in adjacent areas, it can be expected that there will be a slight increase in numbers (NMRPC, 1977b).

There is a possibility for a wet-processing plant to be developed in Fort Kent. In the event that this occurs, it is safe to assume the population in Fort Kent will increase. It is also encouraging to know that the upper reaches of the St. John River which flows through Fort Kent is one of the few sections of river in Northern Maine that can withstand the impacts of a large plant, having the capacity to assimilate the waste (NMRPC, 1977a).

There is a belt of Massive Sulphide deposits which consists of copper-zinc, running through central Aroostook County. The Belt is specifically located in the Fish River Basin. Superior Oil Company and the Louisiana Land and Exploration Company discovered a major copper-zinc deposit at Bald Mountain in Township 12, Range 8. It is a 36 million ton deposit, one of the largest of it's kind in North America. There are no projected plans for the actual mining of this area, mostly due to the fact that it involves two of the four lake areas in Northern Maine which have high potential for recreational development (NERBC, 1981; NMRPC, 1977).

3.4 Critical Areas Program

In order to include the proper identification and assessment of critical areas in planning activities the Maine State Legislature passed an act in 1974 establishing a state register of critical areas. Critical areas are officially recognized areas which contain natural features of significance in the state such as: exceptional plant or animal habitat, areas of great geologic or historical interest, and outstanding scenic areas.

There are eight registered Critical Areas located in the Fish River Basin:

- Fish River Falls found in Fort Kent
- Smith Brook Falls Gorge found in Township 13, Range 8
- Red River Falls Gorge found in Township 14, Range 8

All three of these areas are similar in that they contain rare plant species. Section 4.1 discusses vegetation in detail (ME, 1985). The other five are:

- Fox Brook Falls Gorge found in Township 13, Range 8 is a scenic gorge 440 meters long with cascades dropping a total of 18 meters
- Portage Lake found in the Portage Lake Region has an Ordovician fossil site with a variety of graptolites
- The Nadeau Thoroughfare found in the Eagle Lake Region has well preserved plant fossils for three species
- Nixon Siding Mudstone which shows a significant occurrence of shelby marine fossils and the coral Halysites
- Mosquito Brook Pond which has a simultaneous occurrence of three species of well preserved graptolites (ME, 1985).

4.0 TERRESTRIAL ENVIRONMENT

4.1 Vegetation

Vegetation in the Fish River Basin is a mixture of spruce-fir and northern deciduous forest types covering a large percent of the basin. This is typical of the transitional zone between the Boreal Forest Formation and Eastern Deciduous Formation. Significant stands of northern hardwoods (maple-beech-birch) are found in the higher elevations at the headwaters of the Fish and Aroostook Rivers. Distribution of the vegetation is influenced by soil and moisture conditions, as well as past logging, insect and disease outbreaks, and fire (Corps, 1978a).

Wetland vegetation covers a relatively small percent of the project area. Clearcuts, abandoned and active logging activities, and waterbodies cover the balance of the land in the study area (Corps, 1978a).

Vegetative cover may be classified through a number of procedures. A particular type of ecosystem may serve as a basis for categorizing a cover type. Both the Critical Areas Program and the New England Regional Heritage Program have developed classification systems (see Appendices A, B and C).

4.1.1 Vegetative Cover Types, Relative Area and Distribution

Of the vegetative cover types in the study area the forest community is the dominant cover type. The spruce-fir type is the predominant forest community. As indicated in Section 4.1 the distribution of the spruce-fir forest community in the Fish River Basin area is strongly influenced by soil and moisture conditions as well as past logging, insect and disease outbreaks, and fire (Corps, 1978a). Red spruce and balsam fir stands are typical of the commerical forests in the study area, covering a significant number of acres (Corps, 1978a). Beech, yellow birch, and maple are considered the climax community. Other cover types found are: maple-beech-birch; aspen-birch; elm-ash-red maple; white pine-hemlock; oak, oak-pine.

Spruce-northern hardwood communities of spruce-fir, sugar maple, yellow birch, beech, and white ash cover a moderate percentage of the project area (NMRPC, 1977b). The yellow birch-spruce subtype is found on fertile, moist, well drained soils. The sugar maple-spruce subtype is found upslope bordering on the northern hardwoods. The northern hardwood cover type which includes maple-beech-birch occurs on well drained ridgelines and hilltops, and covers only one percent of the river basin.

Understory growth is practically nonexistent under dense spruce-fir canopies, except in areas of advanced spruce-fir

regeneration where mosses are predominant. Other softwood species present are northern white cedar, black spruce, tamaracks (which occur on extremely wet sites), and old native white pines left during early timber harvesting.

Ground cover in northern hardwood type forests tends to include more ferns and herbs, and less moss than the spruce-fir forests, plus a layer of understory shurbs. A relatively small portion of the study area is covered by grasses, sedges, herbs, and small shrubs such as alder, sweet gale, leatherleaf and meadowsweet. These species are found bordering flatland areas which get flooded seasonally, on islands, and on embankments (Corps, 1977c).

Speckled alder is the dominant species in riparian shrub communities along parts of the Fish River and its tributaries. Flatland areas which get flooded seasonally, islands and embankments of the river are often covered by a border of grasses, sedges, herbs, and small shrubs such as alder, sweet gale, leatherleaf, and meadowsweet (Corps, 1977c).

Various wetland vegetation covers only a small percent of the study area, and occurs mainly in the form of lakes, shrubs, swamps, and bogs. Wetland areas provide important moose habitat (see Section 4.2). Wetlands are discussed more specifically in Section 4.1.2.

Clearcuts, abandoned and active logging activities, and surface waterbodies cover the remaining land in the project area (Corps, 1978a). Much of the abandoned land has been successfully invaded by white spruce (ME, 1975a).

4.1.2 Significant Resource Areas

Significant resource areas are characterized by their relative size, age, species composition, utilization as habitat or uniqueness in being the only one, or one of several, of its kind in the study area. Habitats for rare, threatened and endangered species, wetland areas, and forests containing old and remnant growth are typical significant resource areas.

In the Fish River Basin area the shrub and river cover types previously detailed in Section 4.1.1 serve as habitat for several rare and endangered species. These species are found in the riverside seep community, an open community inhabiting alluvial sands deposited among seepy, cobble, or boulder shores of major rivers. The specific area where significant species are found is in the Frenchville quadrangle (ME, 1985). Significant species are further discussed in Section 6.0.

In areas where wetland vegetative cover type is found, there is a variety of life-forms and species including submergents, floating emergents, and shrub and tree types (Corps, 1978a). Key wetland areas in the project area are found throughout the basin although the most noteworthy lakes area is the Eagle-Square-Cross-Long Lake chain. Maine's wetlands are protected by the Department of Environmental Protection under the Shoreland Zoning Act and the Alteration of Coastal Wetlands Act, and by the Maine Inland Fisheries and Wildlife under the Stream Alteration Act (NERBC, 1981b).

In addition, in various forest areas where the soils are wet, there are remnant mature white pines. These pines scattered throughout the study area, were spared during early timber harvesting, and may be considered a significant resource.

4.2 Wildlife

Historically research, management, and planning activities for wildlife have focused on species that are hunted and/or trapped. The distribution and abundance of nongame birds and mammals, reptiles, and amphibians is largely unknown (ME, 1976a; NERBC, 1981). The status of Maine's birds is probably the best known of the nongame species; however, no master species list is available. The listing compiled by Palmer in 1949 is the most comprehensive record of Maine bird life (ME, 1976a). Current activities are underway by the Maine Breeding Bird Atlas Program and a new updated listing should be available in the fall of 1985 (Albright, 1985; Hancock, 1985).

Within northern Maine approximately 50 species of mammals, 200 species of birds, and 30 species of herptiles have been noted to occur (Corps, 1977d; Corps, 1982; ERT, 1977). Appendix D contains a summary listing of probable wildlife species that may be found in northern Maine.

4.2.1 Common Wildlife Within Land Use Categories/Cover Types

Common wildlife have been delineated as those species which are generally associated with a particular land use category or vegetative cover type. It does not refer to the abundance of a particular wildlife species. Some species are typically found within more than one habitat type and have been discussed accordingly. Wildlife species have been identified for major land use and vegetative communities.

Timber Land/Forest Communities

The majority of the project area is composed of various forest communities which are utilized as timber land. The dominant forest community is spruce-fir. The spruce-fir cover

type supports a variety of wildlife. Carnivores which are common in spruce-fir areas include the black bear (Urus americanus), the marten (Martes americana), the fisher (Martes pennanti) and the bobcat (Lynx rufus). The marten and fisher require a large dense coniferous forest habitat. The bobcat is often found in dense second growth spruce-fir forests broken by clearings and wetlands. The black bear is associated with remote areas of spruce-fir and hardwood forest communities. Common rodents of the spruce-fir cover type are the red squirrel (Tamiasciurus hudsonicus) and the shorttail shrew (Blarina brevicauda). The shorttail shrew has been identified as the most common mammal in northern Maine. In 1952 Stewart and Aldrich studied the breeding birds of spruce-fir forests in northern Maine. The most abundant species identified were Swainson's thrush (Catharus ustulata), warblers (Dendroica spp.), white-throated sparrow (Zonotrichia albicollis), yellow-bellied flycatcher (Empidonax flaviventris), common crow (Corvus brachyrhynchos), and chickadees (Parvus spp.), (Corps, 1977d; ERT, 1977; Corps, 1982).

Northern hardwoods are another vegetative cover type within the forest community. As indicated above the black bear is a carnivore associated with remote spruce-fir areas that may also be found in hardwood forests. The fisher, a common spruce-fir species, has been expanding its range to hardwood forests. Other carnivorous species associated with this cover type are the short and long tailed weasels (Mustela erminea and Mustela frenata). The white-tailed deer (Odocoileus virginianus) and moose (Alces alces) are important game species of hardwood communities. Common rodents are the deer mouse (Peromyscus maniculatus), the woodland jumping mouse (Napaeozapus insignis) and northern flying squirrel (Blaucomys sabrinus) which may also be found in mixed communities, the chipmunk (Tamias striatus), and the woodchuck (Marmota monax) which is associated with brushy hardwood areas. Stewart and Aldrich also studied the breeding birds of hardwood forests in northern Maine. The most abundant species identified were the red-eyed vireo (Vireo olivaceus) warblers (Dendroica spp.), ovenbird (Seiurus aurocapillus), ruffed grouse (Bonasa umbellus), yellow-bellied sapsucker (Sphyrapicus varius), woodpeckers (Picoides spp.) and eastern wood pewee (Contopus virens). Herptiles associated with hardwood areas include the wood turtle (Clemmys insculpta) and American toad (Bufo americanus), (ERT, 1977; Corps, 1977d; Corps, 1982).

Industrial/Commercial Lands

Developed areas do not typically provide significant areas of habitat for wildlife. Vegetation is generally limited to ornamental plantings and growth along parking facilities. Wildlife species adapted to this type of area include the Norway rat (Rattus norvegicus), house mouse (Mus musculus),

rock dove (Columba livia), starling (Sturnus vulgaris) and common crow (Corvus brachyrhynchos).

Water Resource Lands/Wetlands

Water resource lands which include the previously described wetland cover types provide habitat for a number of species. Carnivores associated with these areas include the raccoon (Procyon lotor) which may be found in bottomland hardwood habitats, the mink (Mustela vison), and the river otter (Lutra canadensis). Aquatic furbearers such as the beaver (Castor canadensis) and muskrat (Ondatra zibethica) are common wetland species. The white-tailed deer often utilizes water resource areas for feeding and as wintering grounds. The moose also feeds in wetland areas. Rodents such as bog lemmings (Synaptomys spp.), water shrews (Sorex palustris), and meadow voles (Microtus pennsylvanicus) are also found in water resource areas. A wide range of birdlife is associated with wetland areas from ducks, rails, and other waterfowl to raptors and song birds. Typical species include the common goldeneye (Bucephala clangula), the wood duck (Aix sponsa), Virginia rail (Rallus limicola), osprey (Pandion haliaetus), and red-winged blackbird (Agelaius phoeniceus). Common herptiles found in wetland areas include the eastern garter snake (Thamnophis sirtalis), the bull frog (Rana catesbeiana), the green frog (Rana clamitans melanota), and salamanders (Ambystoma spp.), (ERT, 1977; Corps, 1982; Corps, 1977d).

Agricultural Lands/Clearcuts

Active and abandoned agricultural lands, forest clearcut areas, and associated lands provide valuable openland habitat and edge for many different species. The red fox (Vulpes fulva), the coyote (Canis latrans var.), and striped skunk (Mephitis mephitis) are some of the common carnivores that are associated with agricultural and semi-open lands. White-tailed deer and moose utilize these areas for feeding. The woodchuck and meadow vole (Microtus pennsylvanicus) are rodents found in grassy clearings and farmlands. The snowshoe hare (Lepus americanus) is also found in semi-open land areas. Raptors such as the red-tailed hawk (Buteo jamaicensis), and American kestrel or sparrow hawk (Falco sparverius) feed on the wildlife found in these habitats. Many song birds nest and feed in these areas. For example, the robin (Turdus migratorius), mourning dove (Zenaidura macroura), and catbird (Dumetella carolinensis) are all openland habitat species. Herptiles found in open areas include the American toad and the eastern garter snake (ERT, 1977; Corps, 1982; Corps, 1977d).

4.2.2 Species of Interest

In addition to common species (Section 4.2.1) and protected species (Section 6.0), there are a number of wildlife

species that are of special interest. These species may be of interest for a number of reasons, including:

- o limited or declining populations,
- o real or perceived social value, and
- o their role in the terrestrial ecosystem.

Within the general project area there are three species of interest for northern Maine: the spruce grouse (Canachites canadensis), the pine marten or American sable (Martes americana), and the Canada lynx (Lynx canadensis).

Spruce Grouse

The spruce grouse has been declining in numbers. It is considered to be holding its own in the more remote regions of Maine, but is not common even there. The spruce grouse prefers a coniferous forest habitat. It is a ground nester that nests under brush at the base of a tree in swampy coniferous woods. The foilage and buds of spruce, larch and fir are its main foods in the winter. Insects, herbaceous plants and berries comprise its diet during the remainder of the year (Parks, 1965). Due to the large areas of coniferous forests within the Fish River Basin, this area provides good habitat for spruce grouse.

Pine Marten

The pine marten was once considered rare and in danger of extinction during the 1940's. As a result, trapping of this species was illegal from 1935-1978. In recent years the marten has been increasing in population and trapping is permitted again. There is little historic data on the marten in Maine. The marten is found in spruce fir and northern hardwood forest areas of Maine. More research is needed to determine the range and exact habitat requirements of the marten. Its diet consists mainly of squirrels, other small mammals, nuts and berries (ME, 1984d; ME, 1976a; Corps, 1977d; Corps, 1978c). The Fish River Basin lies within an area where significant numbers of marten are harvested for their fur.

Canada Lynx

The Canada lynx is considered an uncommon species that is declining in Maine. The project area is along the southern edge of the lynx's range. It has been identified as a potential breeding species in the more remote areas of northern and northwestern Maine. The lynx is considered a shy and elusive mammal. Northern forests and swamps are its primary habitat. The lynx's population is closely correlated to that of its chief prey, the snowshoe hare. When snowshoe hare populations increase or decrease, the lynx population tends to

follow suit (Corps, 1978c; Corps, 1977d). The Fish River Basin and adjacent Allagash River Basin lie in a semi-wilderness area which would provide habitat for Canada lynx.

4.2.3 Significant Habitats

Due to its location and low population density much of the project area is in a semi-wilderness state, and as such provides a significant habitat resource. With the exception of protected species habitats which will be discussed in Section 6.0, there are basically two types of significant habitats within the Fish River Basin:

- wetlands, and
- deer wintering areas.

Under Title 12 MRSA Chapter 206-A, the Land Use Regulatory Commission has been charged with sound planning, zoning, and subdivision control of the unorganized and deorganized townships of the state. The Commission has designated portions of the project area as protection districts. These districts are those areas where development would jeopardize significant natural, recreational, and historical resources such as floodplains, shorelands, and wildlife habitat. Within the project area this protection zone includes an area which extends 250 feet from the high water mark along rivers, streams, lakes, and ponds (i.e., wetland resources) and deer wintering habitats (NERBC, 1975; Corps, 1978c).

Wetlands provide valuable habitat for aquatic wildlife. They provide key resting, feeding, and nesting areas for migratory birds. Key wetland resources within the project area have been addressed in Section 4.1.

Deer wintering areas are critical to the survival of the white-tailed deer. They provide shelter and food for deer populations during the winter months. Within the river basin a number of deer wintering areas have been designated by the Maine Department of Inland Fisheries and Wildlife and the State Land Use Regulatory Commission. Table 4.2.3-1 identifies the townships and areas in which deer wintering areas are located (ME, 19851).

4.2.4 Wildlife Refuges/Preserves

There are no federal wildlife refuges or preserves within the Fish River Basin. There are no municipal, state or national parks or recreational areas managed for wildlife within the project area. The State of Maine does not maintain any wildlife management areas within the Fish River Basin.

TABLE 4.2.3-1
SUMMARY LISTING OF DEER WINTERING AREAS
WITHIN THE FISH RIVER BASIN

Township	Area
T15 R8	Rocky Brook Lubbe Brook
T14 R9	Chase Pond Beaver Tail Pond
T14 R8	Fish River Falls Skow Falls
T13 R8	Fox Brook Clayton Stream Carr Pond Carr Pond Stream Long Pond
T12 R8	West Inlet
T15 R5	Dimock Brook Daigle Brook
T16 R5	Barstow Brook The Carry
T16 R4	Black Brook
T15 R5	Goddard Brook Joe Dubay Brook Little Goddard Brook Collicut Brook Blacksmith Brook
T14 R7	Fish River Mosquito Brook
T14 R6	Fish River Mosquito Brook Dead Brook
T13 R7	Fish River
Winterville	Labbe Brook Red River
Wallagrass	Drake Brook Wallagrass Stream Carter Brook

TABLE 4.2.3-1 (Cont'd)
SUMMARY LISTING OF DEER WINTERING AREAS
WITHIN THE FISH RIVER BASIN

Township	Area
T17 R4	McLean Brook
T17 R8	South Branch - Birch River Black Brook Deep Brook

No private nature preserves (e.g., Nature Conservancy or Audubon Society) have been identified within the project area (ME, 1977c; ME, 1985a; DeLorme, 1984; Albright, 1985).

4.2.5 Game Species

The State of Maine, Department of Inland Fisheries and Wildlife has identified the following five groups of game species: big game, upland game, migratory game birds, non-native game, and nongame. Management goals and objectives have been formulated for individual game species as well as groups of game species (ME, 1984c; ME, 1976a; ME, 1984d). Hunting and trapping practices for these species are outlined in Appendix E.

Big Game

The white-tailed deer, black bear, and moose are considered big game in Maine. Of these three species the white-tailed deer is the most intensively managed and hunted. The black bear has long been considered a nuisance species, and has only recently attained the status of a game animal. After approximately 40 years of protection the moose has just been re-established as a game species (ME. 1984d). All three of these species are found within the project area.

Upland Game

Upland game species play an important role in the food web of the terrestrial ecosystem providing food for larger animals and birds of prey. In addition, they also provide enjoyment for hikers and other outdoor enthusiasts and a growing number of hunters (ME, 1976a). The cottontail rabbit, snowshoe hare, gray and red squirrels, ruffed and spruce grouse, and woodchuck are considered upland game species in Maine. In addition, non-native game species (i.e., wild turkey and ring necked pheasant) are also typically considered upland game species, but will be discussed in subsequent sections of this report (ME, 1976a). Many of these upland game species are subject to cyclical fluctuations in their abundance. Climatic factors such as hard crusty snow in winter, which prevents grouse from penetrating the snow surface for cover from predators and the cold, and land use trends which affect the quality and quantity of habitat results in fluctuations in population levels. The effects of these changes in abundance can often be directly correlated to the numbers of predator species (e.g., foxes and owls). All of these upland game species may be found within the general project area (ME, 1976a; ME, 1984d; Corps, 1982).

Migratory Game Birds

The State of Maine lies within the Atlantic Flyway for migratory birds. Subsequently there are a significant number

of migratory game birds, primarily waterfowl within the state. Maine serves as an important breeding ground and wintering area for waterfowl; as well as a migratory passageway. Table 4.2.5-1 identifies individual species and groups of species which are considered migratory game birds. A number of these species are coastal waterfowl which would not typically occur within the project area.

Non-native Game

The wild turkey and ring necked pheasant are two non-native game species which occur in Maine. As previously indicated these species are also generally considered upland game species. A number of attempts have been made to reintroduce the wild turkey to Maine. Stocking and transplant efforts have been concentrated in southern Maine in York and Waldo Counties. The ring necked pheasant was introduced to Maine in the late 1800's, and over the years up to 33,000 birds have been released annually by the Department of Inland Fisheries and Wildlife. No precise estimate is available for nonstocked birds. A survey of district wardens showed that pheasant population was highest in southern, central and coastal areas with abundance declining northwesterly across the state. However, even in areas with the highest abundance ratings the overall population of the species was still relatively low. This species is not widely pursued in Maine, and limited research or management programs are being conducted. Wild turkeys have not been transplanted to the project area, and it would be unlikely to find this non-native species. The ring necked pheasant may be found within the basin; however, due to the fact that the ring necked pheasant does not have a sizable natural reproducing population, it would not be considered a significant game species in this area (ME, 1976a; ME, 1984d).

Nongame

The status of Maine's nongame mammals and herptiles is virtually unknown. The status of Maine's birds is probably the best known but no master species list is available. The most recent listing was compiled in 1949 by Palmer (ME, 1984d). A study is currently underway to update the information on breeding birds of Maine and should be available in the fall of 1985 (Albright, 1985). In 1984 the State of Maine initiated an Endangered and Nongame Wildlife Project. This project is funded through a nongame checkoff on the Maine State Income Tax Form. Funds acquired will be utilized to study and protect the more than 400 species of birds, mammals, reptiles, amphibians, and fish that comprise nongame wildlife in the state. During 1984 more than $110,000 in contributions were made, and are being utilized for the restoration and management of bald eagles, peregrine falcons, least terns and island nesting seabirds (ME, 1984d).

TABLE 4.2.5-1
MIGRATORY GAME BIRDS OF MAINE (ME, 1984c)

Waterfowl:	Brant
	Wild ducks
	Geese
	Swans
Cranes:	Little brown
	Sandhill
	Whooping
Rails:	Coots
	Gallinules
	Sora
	Other
Shorebirds:	Avocets
	Curlew
	Dowitchers
	Godwits
	Knots
	Oyster catchers
	Phalaropes
	Plover
	Sandpipers
	Snipe
	Stilts
	Surf birds
	Turnstones
	Willet
	Woodcock
	Yellowlegs
Pigeons:	Doves
	Wild pigeons

4.2.6 Significant Hunting and Trapping Areas

Hunting for wild game is a major recreational activity throughout northern Maine. The key time for hunting is during the fall when deer and bird hunting seasons occur. The most significant game animals are white-tailed deer, black bear, moose and ruffed grouse (NERBC, 1980).

Trapping pressure is largely contingent upon the market value for furbearer pelts. The market value of most Maine furbearer pelts has declined in recent years with subsequent reductions in harvesting (ME, 1984c).

Current data and information on hunting and trapping is available for each Wildlife Management Unit in the state. These data indicate those areas which may be considered significant or an important resource within the State of Maine due to the number of wildlife harvested (i.e., hunted or trapped). The number of wildlife harvested should not be considered as an absolute indicator of wildlife population densities within an area. Hunting and trapping are influenced by a number of factors, including: accessibility, weather conditions, changes in regulations/restrictions, and the general economy. Figure 4.2.6-1 shows the boundaries for the Wildlife Management Units in northern Maine. The majority of the Fish River Basin lies within Wildlife Management Unit 2 and has been discussed accordingly.

Wildlife Management Unit 2 has 8,689 square miles of white-tailed deer habitat. This is the highest area of deer habitat in the state. Deer harvest records show that in 1983 approximately 4,000 deer were registered in Unit 2. Records show that the significant hunting areas in the basin were in Wallagrass, Eagle Lake, Wintervale, Portage Lake and T13 R18 where from 50-80 deer were harvested in each township. T13 R18 had one of the highest harvests in the country with 83 deer (ME, 1984c; NERBC, 1975).

Although over 20 percent of the black bears harvested in Maine during 1983 were taken in Aroostook County, the number of bears harvested in the Fish River Basin was relatively low. Approximately 25 black bears were harvested in the river basin during 1983. The most significant hunting area was Wallagrass R11 where eight bears were harvested (ME, 1984c).

Wildlife Management Units 1 and 2 are the leading moose areas in the state. Current moose research estimates that there are 12,000 moose within Unit 2. Moose hunting is regulated by permit and hunters are assigned to a zone. As a result hunting data is available for each zone instead of for a particular wildlife management unit. The Fish River Basin lies within the Northeast Zone, which also includes Prestile Stream Basin, Meduxnekeag, Aroostook, and Allagash River Basins. Within this zone 166 moose were harvested in 1983. Significant hunting areas were not identified (ME, 1984c).

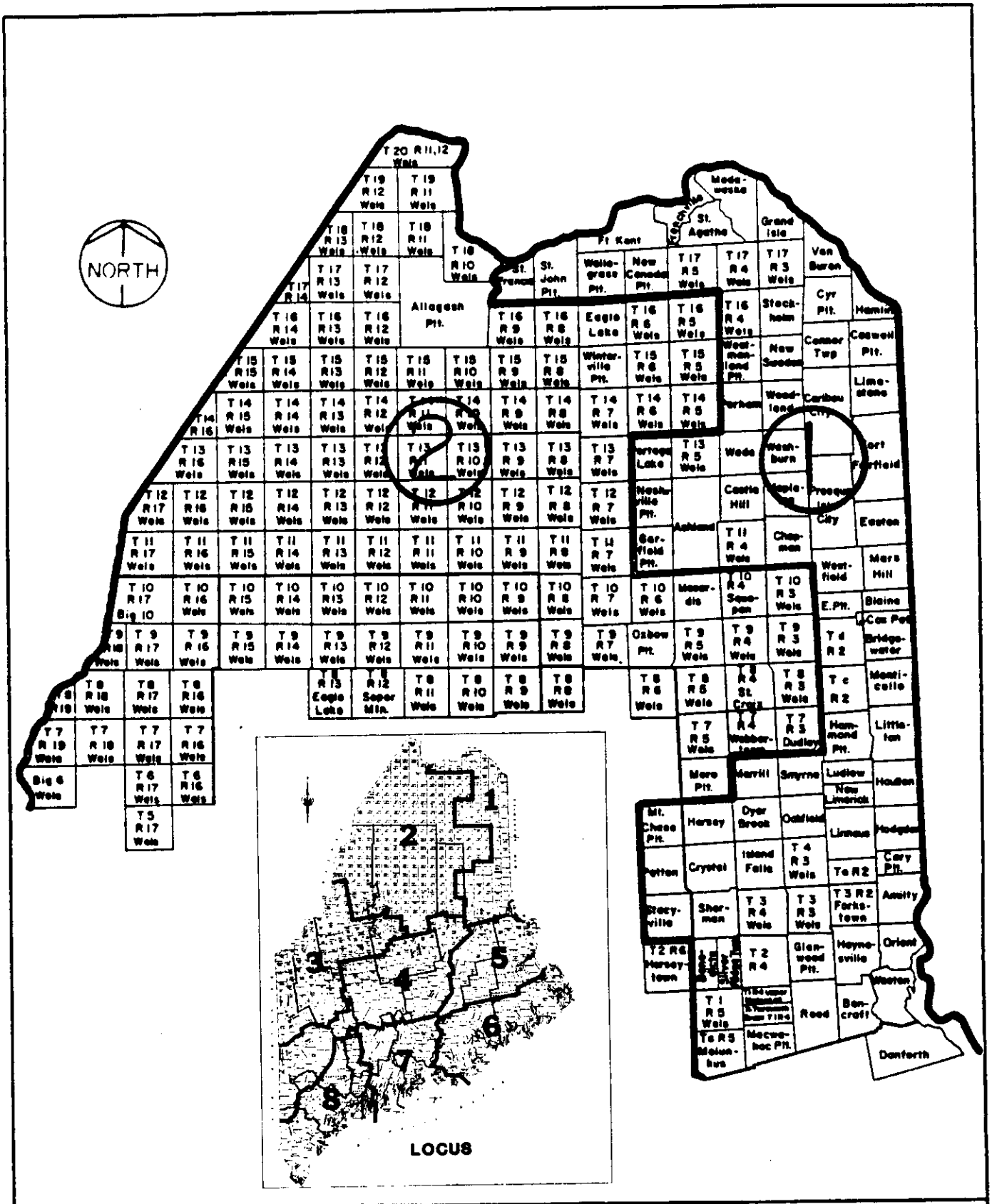


FIGURE 4.2.6-1 NORTHERN MAINE WILDLIFE MANAGEMENT UNITS
(Adapted from NMRPC, 1980 and ME, 1983b))

Wildlife Management Unit 2 produced the highest kill of ruffed grouse per hunter, but had the lowest kill per unit area. An estimated 103,767 ruffed grouse were harvested in Unit 2. Grouse are primarily hunted by driving woods roads until birds are encountered. Significant hunting areas were not identified (ME, 1984c).

Hunting activities related to other wildlife such as snowshoe hare, wild duck, woodcock, and Canada geese are relatively small in Wildlife Management Unit 2 (NERBC, 1980). Wildlife Unit 2 had the lowest harvest of snowshoe hare in the state with an estimated kill of 4,274 (ME, 1984c).

Limited data is available for ten upland and aquatic furbearers (coyote, fox, bobcat, fisher, marten, raccoon, beaver, otter, mink and muskrat) trapped within the Fish River Basin. As with hunting data this information is available for Wildlife Management Unit 2.

Maine coyote pelts are of low value in comparison to coyote pelts from the western part of the country due to variation in the color. This coupled with disease and lower coyote populations has resulted in a decline in the number of coyotes harvested in the state. Although the statewide harvest declined, record numbers of coyotes were harvested in Wildlife Management Unit 2. During 1983, 215 coyotes were trapped (ME, 1984c).

During 1983 there was a lower harvest of fox due to the aforementioned factors as well as competiton from coyotes. Unit 2 is one of the lowest fox harvest areas due to habitat restrictions. Very few fox are taken in the northern and western forest lands. Only 176 fox were harvested in Unit 2 during 1983 (ME, 1984c).

Only ten bobcats were trapped in Wildlife Management Unit 2 in 1983 making it one of the lowest harvest areas in the state. Factors leading to the low harvest include fewer bobcats due to coyote competition, winter losses, and habitat problems as well as low pelt prices (ME, 1984c).

Wildlife Management Unit 2 has one of the highest harvest densities for fisher in the state. During 1983, 298 fisher were harvested. Fisher have the highest average pelt price and as a result more trapping pressure has been placed on the fisher. Harvest restrictions may be required to maintain current populations (ME, 1984c).

The marten has recently been reclassified as "American Sable." This has resulted in an increase in pelt prices and trapping pressure. Wildlife Management Unit 2 has the second highest marten harvest in the state with over 3,820 trapped in 1983. This is over 70 percent of the total number of marten harvested in the state (ME, 1984c).

Very few raccoons are found or harvested in the wooded areas of northern Maine. Approximately 800 raccoon were trapped in Unit 2 during 1983. The number of hunters pursuing raccoon has dropped considerably as a result of the decline in their pelt value (ME, 1984c).

Beaver pelt values have remained low for four consecutive years. This has resulted in a total beaver harvest almost half of the desired management level. Changes in forest management activites have provided excellent habitat conditions for beaver, and high densities throughout the state. With low harvesting, beaver are creating nuisance problems throughout Maine. Only 963 beaver were trapped in Wildlife Management Unit 2 during 1983 (ME, 1984c).

The lowest number of otters harvested in 1983 was in Wildlife Managements Units 1, 2, and 3. There are federal and state management programs to guard against over harvesting the otter. Data indicates otter populations may be increasing due to improvements in water quality which has expanded their habitat (ME, 1984c).

Data on mink harvesting has only been required since 1981. Prior to that date the numbers of mink harvested were not tagged. Wildlife Management Unit 2 has one of the higher harvest yield in the state with 332 mink harvested (ME, 1984c).

Muskrat pelts are not tagged in Maine and no records are available for the numbers harvested other than counts kept by fur buyers. Due to the large number of muskrats harvested each year (an estimated 45,000 in 1983), no attempts are made to record the number or distribution of the muskrats harvested in Maine (ME, 1984c).

5.0 AQUATIC ENVIRONMENT

5.1 Resource Area Description

The Fish River is a major sub-drainage of the St. John River located west of the Allagash River drainage basin and northwest of the Aroostook River drainage basin. The Fish River is 56 miles long, contains 69 lakes and ponds, and has a drainage area of approximately 89 square miles. Square Lake (8,150 acres) is the largest lake in the drainage basin. Lake inventories have been done for most lakes and ponds larger than ten acres (Warner, 1965; Baum, 1982).

The main stem of the Fish River arises at Clayton Lake and flows north into the main headwater lake, Fish River Lake. From Fish River Lake the river flows southeasterly into Portage Lake, and then northerly into St. Froid Lake. Two major tributaries, the Red River and Birch River, flow into St. Froid Lake. St. Froid Lake flows through Nadeau Thoroughfare into Eagle Lake. A second major branch of the Fish River flows into Eagle Lake in its northeast corner. This branch originates in Long Lake and flows through river-like thoroughfares connecting Long and Mud Lakes, Mud and Cross Lakes, Cross and Square Lakes, and Square and Eagle Lakes. From Eagle Lake the main stem of the Fish River flows north to its confluence with the St. John River at Fort Kent (Warner, 1965; Baum, 1982).

The diversity of water areas in the Fish River drainage basin offers a wide variety of fishing opportunities for coldwater game fish, from trout fishing in small brooks and ponds to landlocked salmon, Salmo salar, and lake trout, Salvelinus namaycush, fishing in the larger lakes. Lake and pond inventory reports have been published for 47 lakes and ponds in the drainage. General information from these inventories is presented in Table 5.1-1. Table 5.1-2 summarizes additional aquatic resource information including important spawning and nursery areas for several lakes and ponds in the drainage basin.

5.2 Water Quality

The waters of the Fish River Basin are characteristically of good quality (see Figure 5.2-1). The Fort Kent area waters of the Fish River and its tributaries are the only section with Class C waters. Heading upstream the waters become consistantly better. From Fort Kent upstream to Eagle Lake the waters are Class B-1. Waters upstream of St. Froid Lake are upgraded to Class A. All unmarked segments and tributaries, not otherwise specified are Class B-2 (ME, 1984). These waters provide high quality wildlife and fish habitats with the exception of the Fort Kent area waters which have been damaged by industry and population.

Lake	Township	Area (acres)	Distribution of major species									
			Brook trout	Salmon	Togue	Blueback trout	Smelt	Yellow perch	Whitefishes	Suckers	Cusk	Hornpout
Basil Pond	Fort Kent	19	×									
Black Lake	Fort Kent	51	×							×		×
Black Lake (Big)	T15 R9	147	×			×		×				
Blake Lake	T16 R6	128	×								×	
Carr Pond	T13 R8	307	×	×	×				×	×		
Clayton Lake	T12 R8	264	×	×						×		
Cross Lake	T16 R5, T17 R5	2,515	×	×			×	×	×	×	×	×
Daigle Pond	New Canada	36	×									
Deboullie Lake	T15 R9	262	×			×		×		×		
Denny Pond	T15 R9	25	×									
Dickwood Lake	Eagle Lake	96	×							×		
Dimock Pond	New Canada	4	×									
Eagle Lake	Winterville, etc.	5,581	×	×			×	×	×	×	×	×
Ferguson Pond	T14 R8	51	×									
First Chase Pond	T14 R9	12	×		×					×		
First Sly Brook Lake	New Canada	90	×	×						×		
Germain Lake	Madawaska	122	×									
First & Second Wallagrass Lakes	T16 R8, etc.	281	×	×					×	×		
Fish Lake	T13 R8, T14 R8	2,642	×	×	×				×	×	×	×
Galilee Pond	T14 R9	9	×									
Gardner Lake	T15 R9	288	×			×		×		×		
Island Pond	T14 R8	27	×							×		
Island Pond	T15 R9	32	×									
Long Lake	St. Agatha, etc.	6,000	×	×			×	×		×	×	×
Lucifee Pond	T14 R8	13	×									
Moccasin Pond	T14 R8	32	×									
Mosquito Brook Pond	T14 R7	10	×									
Mud Lake	T17 R4	972	×	×			×	×		×	×	×
Mud Pond	Stockholm	45	×									
North Little Black Pond	T15 R9	6	×									
North Pond	T14 R9	15	×									
Pennington Pond	T15 R6	45	×									
Portage Lake	Portage Lake	2,474	×	×			×	×	×	×	×	×
Pushineer Pond	T15 R9	45	×			×		×	×			
Round Pond	T14 R8	90	×	×					×	×	×	×
St. Froid Lake	Winterville, etc.	2,400	×	×			×	×	×	×	×	×
Second Chase Pond	T14 R9	182	×		×					×		
Second Sly Brook Lake	New Canada	13	×	×						×		
Soldier Pond	Wallagrass	96	×	×			×	×	×	×	×	×
South Little Black Pond	T15 R9	6	×									
Stink Pond	T15 R9	16	×									
Square Lake	T15 R5, T16 R5	8,150	×	×			×	×		×	×	×
Third Chase Pond	T14 R9	102	×		×					×		
Third Sly Brook Lake	New Canada	141	×	×	×					×		
Third Wallagrass Lake	St. John	45	×									
Upper Pond	T15 R9	17	×									

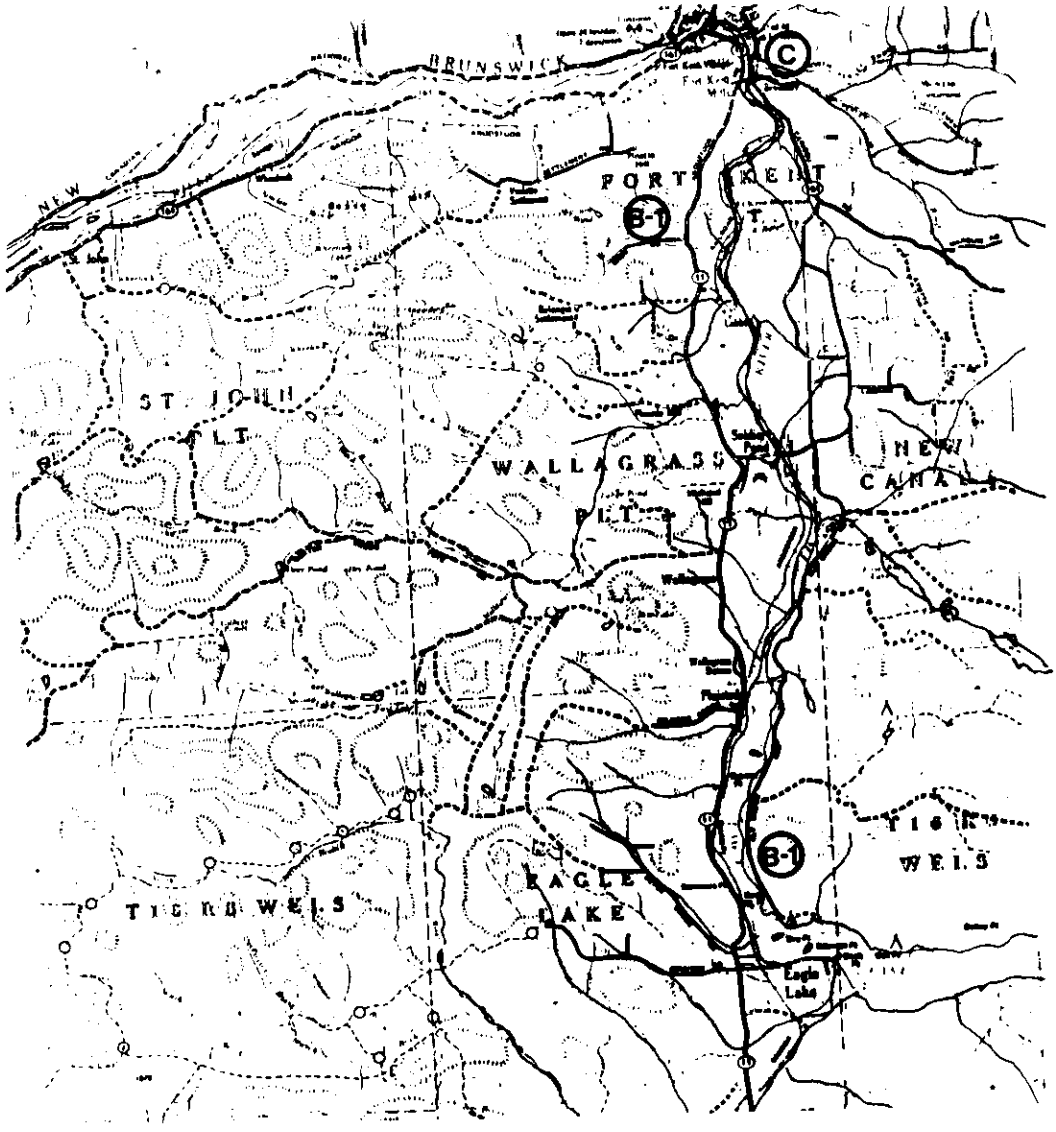
TABLE 5.1-1
LIST OF SURVEYED LAKES IN THE FISH RIVER DRAINAGE AND DISTRIBUTION OF MAJOR FISH SPECIES (Warner, 1965)

TABLE 5.1-2
AQUATIC RESOURCE INFORMATION ON LAKES AND PONDS IN THE FISH RIVER DRAINAGE BASIN
(ME, 1953, 1954b, 1958c, 1969c, 1969d, 1969f, 1954c, 1976f, 1976e, 1976d, 1976c, 1977e)

Lake or Pond	Aquatic Resource Description
Mud Lake	12 species of fish; shallow lake; good salmon spawning areas in Cross and Long Lake Thoroughfares; abundant coarse competing fish.
Black Lake	3 species of fish; deep, coldwater lake; yellow perch compete with brook trout; trout fishery maintained by natural reproduction.
Portage Lake	17 species of fish; shallow lake; coarse fish abundant; excellent spawning and nursery areas for salmon in main outlet and inlet of Fish River; adequate brook trout spawning and nursery areas.
Deboullie Lake	9 species of fish; cold, deep lake; spawning areas for trout are in lake and inlet tributary; trout population supported by natural reproduction; yellow perch compete with trout.
Gardner Lake	9 species of fish; ideal lake for brook trout; trout population maintained by natural reproduction in lake and two inlet tributaries.
Pushineer Pond	9 species of fish; coldwater pond; yellow perch compete with trout; trout population supported by natural reproduction in pond and migration from Deboullie Pond and Red River.
Togue Pond	9 species of fish; abundant spawning areas for lake trout; lake trout population is self-sustaining through natural reproduction; spawning areas for salmon and brook trout are limited.
Fish River Lake	18 species of fish; mediocre fishery for salmon, brook trout, lake trout; yellow perch compete with coldwater fish; excellent brook trout spawning and nursery area in Chase and Smith Brooks.

TABLE 5.1-2 (continued)
AQUATIC RESOURCE INFORMATION ON LAKES AND PONDS IN THE FISH RIVER DRAINAGE BASIN
(ME, 1953, 1954b, 1958c, 1969c, 1969d, 1969f, 1954c, 1976f, 1976e, 1976d, 1976c, 1977e)

Lake or Pond	Aquatic Resource Description
Long Lake	16 species of fish; excellent spawning and nursery area for salmon in Long Lake Thoroughfare; spawning areas for brook trout in small inlet tributaries; salmon spawning and nursery areas in Paulette and Mud Brooks; good hook-and-line smelt fishery in winter and spring.
Square Lake	18 species of fish; ideal habitat for salmon and trout; good salmon spawning and nursery areas in Eagle Lake Thoroughfare, Square Lake Thoroughfare, and Goddard Brook; brook trout spawning areas in smaller inlets.
St. Froid Lake	20 species of fish; coldwater lake; excellent salmon sapwning areas at main outlet and inlet of lake, and in Red and Birch Rivers; good spawning and nursery areas in small inlets for brook trout.
Eagle Lake	18 species of fish; excellent spawning areas for salmon - Nadeau Thoroughfare, Eagle Lake Thoroughfare, and Eagle Lake Outlet; brook trout spawning areas in small inlet tributaries; salmon and trout populations maintained by natural reproduction.

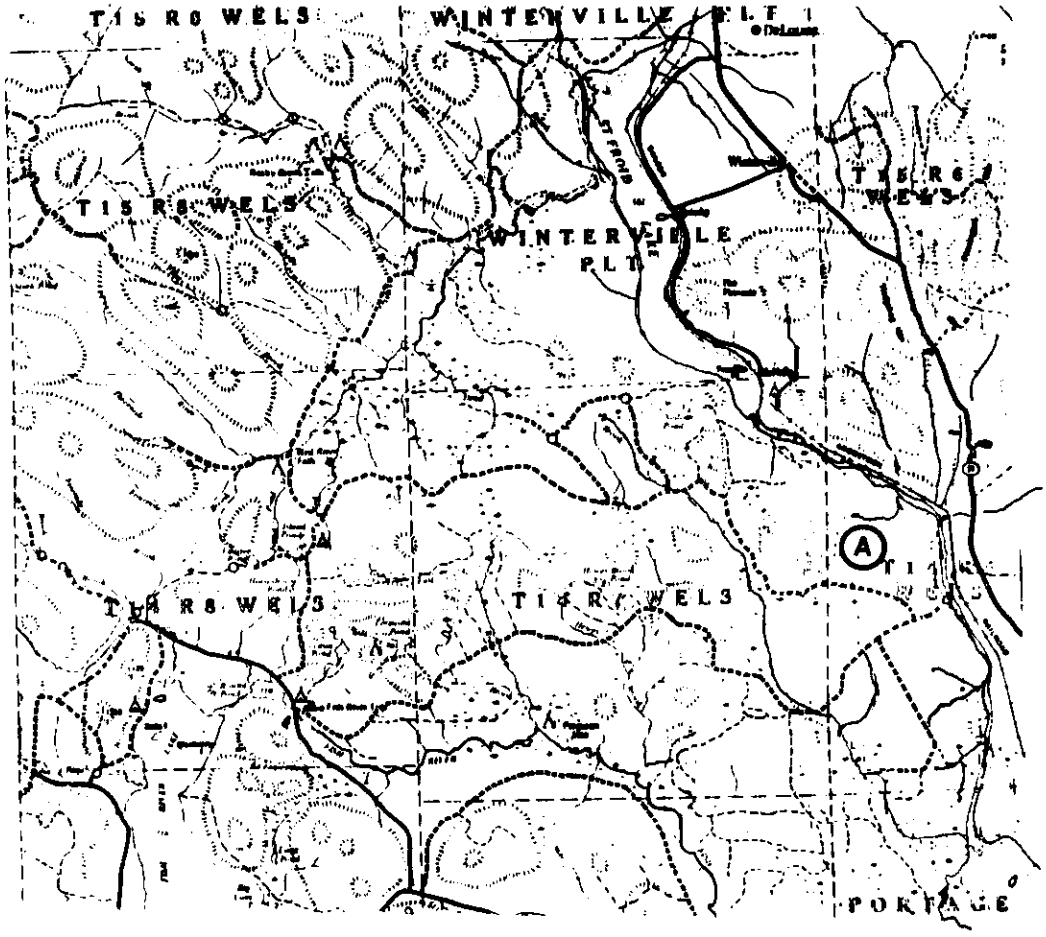


Class B is the second highest classification and is divided into two designated groups: B-1 and B-2.

B-1 - Waters of this class are considered to be the higher quality of the Class B group. These waters are acceptable for recreational purposes, including water contact recreation, for use as potable water supply after adequate treatment and for fish and wildlife habitat.

Class C is the third highest classification. Waters of this class are to be of such quality as to be satisfactory for recreational boating and fishing, for fish and wildlife habitat and for other uses except potable water supplies and water contact recreation, unless these waters are adequately treated.

FIGURE 5.2-1 FISH RIVER BASIN
(Adapted from Delorme, 1984)



Class A is the highest classification which can be used for recreational purposes, including bathing, and for public water supplies after disinfection.

FIGURE 5.2-1 FISH RIVER BASIN (continued)

(Adapted from Delorme, 1984)

5.3 Common Fish Species

5.3.1 Warmwater Species

There are ten common warmwater resident fish species reported to occur (Warner, 1965; Baum, 1982) in the Fish River drainage basin (see Table 5.3.1-1). The brown bullhead and yellow perch are considered minor game species although the latter may be regarded as a nuisance species or unwanted competitor with salmon or trout (ME, 1977; Foye, 1968). Minnows, sticklebacks, and suckers are important in the inland fishery for their position in the food chain. Their primary value is as forage for the more desirable food and game fishes (Everhart, 1976).

5.3.2 Coldwater Species

There are 16 common coldwater resident fish species reported to occur (Warner, 1965; Baum, 1982) in the Fish River drainage basin (see Table 5.3.2-1). The landlocked salmon, brook trout, blueback trout, lake trout (togue), rainbow smelt, lake whitefish, and burbot are considered game fish (ME, 1977). The minnows and freshwater sculpin serve as forage fish for the game fish. (Everhart, 1976).

5.3.3 Migratory Species

There are no migratory species reported from the Fish River drainage basin. Migratory fish have never had access to the Fish River drainage basin due to the natural ledge and falls at Grand Falls, New Brunswick, Canada (Warner, 1965; Baum, 1982).

5.4 Species of Special Interest

The blueback trout is a species of special interest in the Fish River drainage basin. It is considered to be a landlocked relative of the Arctic char (Salvelinus alpinus). Blueback trout were once common to the Rangely Lakes of Maine, but became extinct there in the early 1900s. Distribution today includes Pushineer Pond, Deboullie, Black, and Gardner Lakes in the Fish River drainage basin (McLane, 1974; ME, 1954b, 1969c, 1969d, 1969f).

The blueback trout has very specific habitat and food requirements that are distinct from the ordinary Arctic char. In Maine lakes the upper limit of the blueback's depth distribution is correlated with cold water of the hypolimnion, where it feeds on aquatic insects and invertebrates. There is little angling demand for bluebacks because of their small size (6-12 inch average). The opportunity to fish for bluebacks is limited by regulated access or absence of roads to the specific fishing areas. Bluebacks can be caught by anglers using worms, flies, or spinning gear. The management goal for blueback

TABLE 5.3.1-1
WARMWATER FISH SPECIES OF THE FISH RIVER BASIN

Common Name	Scientific Name
CYPRINIDAE - Carps and Minnows	
Golden shiner	*Notemigonus crysoleucas*
Common shiner	*Notropis cornutus*
Blacknose shiner	*Notropis heterolepis*
Creek chub	*Semotilus atromaculatus*
CYPRINODONTIDAE - Killifish	
Banded killifish	*Fundulus diaphanus*
ICTALURIDAE - Bullheads	
Brown bullhead	*Ictalurus nebulosus*
CATOSTOMIDAE - Suckers	
White sucker	*Catostomus commersoni*
GASTEROSTEIDAE - Sticklebacks	
Threespine stickleback	*Gasterosteus aculeatus*
Ninespine stickleback	*Pungitius pungitius*
PERCIDAE - Perches	
Yellow perch	*Perca flavescens*

TABLE 5.3.2-1
COLDWATER FISH SPECIES OF THE FISH RIVER BASIN

Common Name	Scientific Name
SALMONIDAE - Trouts	
Landlocked salmon	*Salmo salar*
Brook trout	*Salvelinus fontinalis*
Blueback trout	*Salvelinus alpinus*
Lake trout (togue)	*Salvelinus namaycush*
OSMERIDAE - Smelts	
Rainbow smelt	*Osmerus mordax*
CYPRINIDAE - Minnows and Carps	
Lake chub	*Covesius plumbeus*
Northern redbelly dace	*Phoxinus eos*
Finescale dace	*Phoxinus neogaeus*
Fallfish	*Semotilus corporalis*
Pearl dace	*Semotilus margarita*
Blacknose dace	*Rhinichthys atratulus*
CATOSTOMIDAE - Scukers	
Longnose sucker	*Catostomus catostomus*
COREGONIDAE - Whitefish	
Round whitefish	*Prosopium cylindraceum*
Lake whitefish	*Coregonus clupeaformis*
GADIDAE - Codfishes	
Burbot (cusk)	*Lota lota*
COTTIDAE - Sculpins	
Slimy sculpin	*Cottus cognatus*

trout is to maintain abundance at present levels and encourage increased angler use by providing higher quality fish in both size and abundance, and by promoting unrestricted access to their waters (Warner, 1965; McLane, 1974; ME, 1977b).

Another species of special interest in the Fish River drainage basin is the landlocked salmon. These salmon were not native to the Fish River drainage but were introduced. Sizable salmon populations are present in most of the eight major lakes in the drainage basin (Warner, 1965; ME, 1977b). Landlocked salmon are periodically stocked in the Fish River Chain of Lakes. There are three fish hatcheries and four rearing stations for landlocked salmon in Maine (Delorme Publishing Co., 1984). Stocking records for 1983 and 1984 indicate that the following areas were stocked with landlocked salmon (Fenderson, 1985):

1984

- Eagle Lake - 2,800 spring yearlings
- Cross Lake - 1,250 spring yearlings
- Square Lake - 2,475 spring yearlings
- Long Lake - 6,000 spring yearlings

1983

- Eagle Lake - 2,800 spring yearlings
- Portage Lake - 600 spring yearlings
- Cross Lake - 2,500 spring yearlings
- Long Lake - 6,000 spring yearlings
- Square Lake - 4,300 spring yearlings

Spawning and nursery areas for the salmon in the Fish River Chain of Lakes are excellent. Most of the salmon spawning and nursery areas are located in the river-like thoroughfares connecting the lakes. To reproduce successfully, salmon require swift, clean water, flowing over a gravel bottom (Warner, 1965; ME, 1953, 1958c, 1976f, 1976e, 1976d, 1976c, 1977e).

Naturally occurring smelts are the main food of the salmon in the Fish River Chain of Lakes. Sticklebacks, insects, and minnows are also important forage organisms. Fish species other than forage fish are competition and can be a serious limiting factor to the salmon populations. Serious competitors include yellow perch, fallfish, suckers, and bullheads (Everhart, 1976; McLane, 1974).

5.5 Game Species

The State of Maine Department of Inland Fisheries and Wildlife has 14 fish species that are classified as "major" game fish. Of these there are seven that occur in the Fish River drainage basin. The coldwater game species are the landlocked salmon, brook trout, blueback trout, lake trout (togue), rainbow smelt, lake whitefish, and burbot (cusk). There are no major warmwater game species present. The brown bullhead and yellow perch are warmwater species that are considered minor game species (ME, 1977b; Baum, 1982; Foye, 1968; Everhart, 1976). Fishing practices for these species are outlined in Appendix F.

5.6 Significant Fishing Areas

The recreational fishery in the Fish River drainage basin ranges from trout fishing in small brooks and ponds to landlocked salmon and lake trout fishing in the larger lakes. Fishing pressure on the smaller trout ponds varies with ease of access and quality of trout fishing available. The trout fishing in turn depends on the characteristics of each water body and its ability to produce and support fish (Warner, 1966; Bourque and Timpano, 1973).

The Fish River Chain of Lakes, especially Square, Eagle, and Long lakes, is known for good salmon fishing. Popular areas for smelt fishing are Portage, St. Froid, Eagle, and Long Lakes. Native lake trout (togue) fishing is fairly good in Fish River Lake, Second and Third Chase, and Carr Ponds. Lake trout were reintroduced into St. Froid Lake in 1969 to provide an additional fishery (Bourque and Timpano, 1973). More detailed information (Basley, 1985) on popular fishing areas may be found on Rable 5.6-1.

TABLE 5.6-1
POPULAR FISHING AREAS IN THE FISH RIVER BASIN

Location	Type of Fishing
Clayton Lake	brook trout
Carr Pond	lake trout, brook trout, salmon
Fish River Lake	well used; lake trout, salmon and brook trout
Fish River Falls	heavily fished for brook trout and salmon
Smith Brook, tributary to Fish River Lake	brook trout
Chase Brook, tributary to Fish River	brook trout
St. Froid Lake	lake trout, salmon, brook trout
Red River and Birch River, tributaries to St. Froid Lake	brook trout
St. Froid Lake to Eagle Lake, Nadeau Thoroughfare	popular in fall for salmon
Eagle Lake	salmon, brook trout, lake trout
Area from Eagle Lake to Soldier Pond	popular for salmon and brook trout
Area from Ft. Kent Municipal Airport to Ft. Kent, confluence with St. John River	brook trout

6.0 PROTECTED SPECIES

6.1 Federally Designated Threatened and Endangered Species

There are a number of federally listed endangered and threatened species in Maine. In addition, there are species which have been proposed for listing as endangered or threatened species. There are three groups of endangered and threatened species which may occur within the Fish River Basin: mammals, birds and plants.

Mammals

The eastern cougar (Felis concolor cougar) is an endangered species that has been listed as occurring within the project area. This species may be extinct in Maine. There have been no substantiated reports of its occurrence in the northeast (USFWS, 1984; Corps, 1977c; Corps, 1981; Corps, 1982).

Birds

There are three endangered bird species which nest or pass through the state during migration: the bald eagle (Haliaeetus leucocephalus), American peregrine falcon (Falco peregrinus anatum) and Artic peregrine falcon (Falco peregrinus tundrius). The Artic peregrine falcon is a migratory bird which does not nest within the state. Programs are underway to re-establish the bald eagle and American peregrine falcon to their former breeding ranges in Maine. Neither of these species have been listed as nesting within the Fish River Basin (USFWS, 1984; Corps, 1977c; Albright, 1985; ME, 1984d). However, the bald eagle is nesting in the adjacent Allagash River Basin. This nest represents one of two breeding sites for the bald eagle in the upper third of the state (NERBC, 1981).

Plants

The small whorled pogonia (Isotria medeoloides), an orchid, and the Furbish lousewort (Pedicularis furbishiae), a snapdragon, have been identified as endangered plant species in Maine. In addition, over a half dozen other species have been proposed for listing as threatened or endangered species. Neither of these plant species or those which have been proposed for listing have been identified within the project area (USFWS, 1983; USFWS, 1984; ME, 1985m; Albright, 1985).

6.2 Maine Species of Concern

Within the State of Maine a number of species of flora and fauna have been identified as species of concern. The Critical Areas Program (see Section 3.4) is responsible for the inventory and listing of significant natural features, including rare flora. Environmental groups such as the Maine

Audubon Society and the Nature Conservancy have also developed lists of species of concern. The method and criteria for classifying these species varies among the different groups; however, their objective of identifying and protecting species of concern is the same.

6.2.1 State Rare Species Program

The identification and listing of rare species within the State of Maine is an ongoing process. As part of its program to identify and conserve the significant natural features of Maine, the Critical Areas Program has developed the rare plant inventory. The inventory includes the identification of rare plant species, the documentation and registration of rare plant stations, and the study of unusual plant communities (see Appendix G) (ME, 1985m; ME, undated c).

The Critical Areas Program has also identified a number of significant species of wildlife (e.g., aquatic invertebrates, terrestrial invertebrates, cold blooded vertebrates, birds and mammals). Although these species are significant they have not been designated as rare (ME, undated c).

6.2.2 Delineation of Species of Concern

In addition to the rare plant species and significant wildlife species identified by the Critical Areas Program, environmental groups such as the Nature Conservancy have also identified rare and significant species. These species are collectively referred to as species of concern.

Plants

Within the Fish River Basin a number of rare plant species have been identified. The Maine Critical Areas Program has identified approximately 30 rare plants as occurring within the general project area from historical records and recent field investigations. These plants were found along the Fish River in general, at Portage Lake, at Fish River Falls, at Mosquito Brook, at McLean Brook, at Long Lake, at Eagle Lake, and within the communities of Fort Kent, Frenchville, Madawaska, Wallagrass, as well as a number of the townships. There are three registered critical areas for rare plants within the Fish River Basin: Fish River Falls, Smith Brook Falls Gorge and Red River Falls Gorge (ME, 1985m). Information on individual species, their habitat requirements and location may be found in "A Compilation of the Critical Areas Program Botanical Fact Sheets". In addition the Nature Conservancy's Maine Natural Diversity Data Base has identified seven rare plant species within the Fish River Basin. These rare plant species have been documented at approximately 14 locations within the general project area (Albright, 1985).

Mammals

Information from the Maine Natural Diversity Data Base indicated that no rare mammals had been identified within the Fish River Basin. Communications indicated that the Long-tailed shrew (Sorex dispar), which is rare in the state with only about 20 occurrences, may occur within higher elevations (Albright, 1985). Data on the yellow-nosed vole (Microtus chrootorrhinus) which is classified as a significant species by the Critical Areas Program is not available at this time (Albright, 1985; ME, undated c).

Birds

As it was previously indicated current information on the breeding birds of Maine will not be available from the Atlas of Breeding Birds of Maine indicate that there are six (6) species of concern within the general project area. Four of these species: pied-billed grebe (Podiceps auritus), American wigeon (Anas americana), red-shouldered hawk (Buteo lineatus), and Virginia rail (Rallus limicolc) have been identified as confirmed breeders within the basin. The yellow rail (Coturnicops noveboracensis) is reported as an unconfirmed breeder in Aroostook County wetlands, and Bonaparte's gull (Larus philadelphia) is an unconfirmed breeder on Portage and Allagash Lakes. In addition, although there have been no confirmed sightings for the following species of concern, they are suspected of occurring within the river basin:

o	Least bittern	Ixobrychus exilis
o	Gadwall	Anas strepera
o	Pintail	Anas acuta
o	Redhead	Aythya americana
o	Sora rail	Porzana carolina
o	Long-eared owl	Asio otus
o	Short-eared owl	Asio flammeus
o	Sedge wren	Cistothorus platensis

(Albright, 1985)

The Critical Areas Program has identified some 18 species of significant birds in Maine (ME, undated). The great blue heron (Ardea herodias) has been identified as nesting on Cross Lake, and the black tern (Chlidonias niger) has been identified at Portage Lake (CNA, 1976). Data on other significant birds species within the project area is not available at this time.

Other

No rare amphibians, reptiles, mussels or fish were identified for the study area from the Maine Natural Diversity Data Base. Data on significant invertebrates and vertebrates as identified by the Critical Area Program is not available at this time.

7.0 REFERENCES

Albright, John. 1985. Personal Communication. July 26 and 31, August 7, 1985. Nature Conservancy/Natural Heritage Program. Brunswick, ME.

Anderson, Kenneth H. 1966. "Osprey." Maine Fish and Game. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

Anderson, Kenneth. 1985. Personal Communication. July 11, 1985. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

Anderson, Walter A. 1980. Evaluation of the Mineral Potential Upper St. John River Valley Aroostock County, Maine. U.S. Army Corps of Engineers, New England Division. Waltham, MA.

Andrews, P. 1985. Personal Communication. August 6, 1985. Fisheries Biologist. State of Maine, Department of Inland Fisheries and Wildlife, Research Office, Box 1298, Bangor, ME.

Arndt, Ken. 1985. Personal Communication. July 16, 1985. Northern Maine Regional Planning Commission. Caribou, ME.

Arndt, Ken. 1985. Personal Communication. July 23, 1985. Caribou, ME.

Atlantic Sea-Run Salmon Commission (ASRSC). 1984-1985. Atlantic Salmon Update. Bangor, ME.

Au Clair, R.P. 1979. "Togue - Will Today's Limits Ruin Tomorrow's Fishing?" Maine Fish and Wildlife. Maine Fish and Wildlife Department. Augusta, ME.

Augusta, Maine, Town of, Planning Commission. 1985. Land Use Map. Augusta, ME.

Badger, John. 1985. Personal Communication. July and 22, 1985. St. John-Aroostock RC & D, RC & D Coordinator. Presque Isle, ME.

Basley D. 1985. Personal Communication. August 12, 1985. Regional Fisheries Biologist. State of Maine, Maine Department of Inland Fisheries and Wildlife, P.O. Box 416, Ashland, ME.

Baum, E. 1985. Personal Communication. July 22, 1985. Program Co-ordinator. State of Maine, Marine Atlantic Sea-run Salmon Commission, Bangor, ME.

Baum, E.T. 1974. "Tagged Atlantic Salmon: Where Do They Go?" Maine Fish and Game. Maine Fish and Game Department. Augusta, ME.

Baum, E.T. 1982. Saint John River Watershed. An Atlantic Salmon River Management Report - Aroostook, Meduxnekeag, Prestile, and Upper St. John. Atlantic Sea-Run Salmon Commission. Bangor, ME.

Baum, E.T. 1983-1984. "Atlantic Salmon Facts of Life," Maine Fish and Wildlife. Maine Fish and Game Department. Augusta, ME.

Baum, E.T. 1985. Personal Communication. July 22, 29 and August 7, 1985. Program Coordinator. State of Maine, Atlantic Sea Run Salmon Commission, P.O. Box 1298, Bangor, ME.

Beland, K.F. 1984. Strategic Plan for Management of Atlantic Salmon in the State of Maine. Atlantic Sea-Run Salmon Commission. Bangor, ME.

Blanchard, Harold M. 1978. "Hardwood Habitats." Maine Fish and Wildlife. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

Boettger, Robert W. 1968. "Then and Now: Maine's Beaver Trapping Seasons." Maine Fish and Game. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

Bourque, Peter. 1985. Personal Communication. July 16, 1985. State of Maine, Department of Inland Fisheries and Wildlife, Director Fisheries and Hatcheries Division. Augusta, ME.

Burgason, Barry N. 1980. Management Plan For Lt. Gordon Manuel Wildlife Management Area. State of Maine, Department of Inland Fisheries and Wildlife. Ashland, ME.

Center For Natural Areas (CNA). 1976. A Preliminary Listing of Noteworthy Natural Features In Maine. State of Maine, Planning Office, Critical Areas Program. Augusta, ME.

Cieslinski, Thomas. 1985. Personal Communication. July 22, 1985. State of Maine, Department of Conservation, Bureau of Parks and Recreation. Augusta, ME.

Clark, Dale. 1985. Personal Communication. July 19 and 23, 1985. Department of Inland Fisheries and Wildlife, Public Information Division. Augusta, ME.

Connors, James. 1985. Personal Communication. July 15, 1985. Land Use Regional Commission. Augusta, ME.

Corr, Patrick O. and Alan E. Hutchinson. 1983. 1982-83 Migratory Bird Project Report. State of Maine, Department of Inland Fisheries and Wildlife, Wildlife Division Leaflet Series, Volume 15, No. 1. Augusta, ME.

Cowperthwaick, Al. 1985. Personal Communication. July 19, 1985. North Maine Woods, Inc. Ashland, ME.

DeLorme Publishing Co. 1985. Personal Communication. July 15, 1985. Topographic Map. Freeport. ME.

DeRoche, S.E. 1966. "Lake Trout," Maine Fish and Game. Maine Fish and Game Department. Augusta, ME.

DeRoche, S.E., 1969. "A Candid Appraisal of Maine's Stream Stocking Program," Maine Fish and Game. Maine Department of Inland Fisheries and Game. Augusta, ME.

Department of the Army, New England Division, Corps of Engineers (Corps). 1982. Water Resources Investigation, Reconnaissance Report St. John River Basin, Maine Aroostook River Watershed. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1976a. Water Resources Investigation St. John River Basin Maine, Preliminary Report (Main Report). Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1974. Draft Environmental Statement Saint John River Flood Protection Project Fort Kent, Maine. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1980. Water Resources Investigation St. John River Basin, Maine, Flood Control, Power and Conservation, Aroostock River Status Report. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1977a. Environmental Impact Statement, Dickey-Lincoln School Lakes, Appendix C Social and Economic Analysis. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1977b. Environmental Impact Statement, Dickey-Lincoln School Lakes, Appendix E Aquatic Ecosystem and Fisheries Studies. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1977c. Environmental Impact Statement, Dickey-Lincoln School Lakes, Appendix F Terrestrial Ecosystem Analysis. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1978a. Environmental Impact Statement, Dickey-Lincoln School Lakes, Appendix F Terrestrial Ecosystem Analysis (Supplement). Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1981. Environmental Impact Statement, Dickey-Lincoln School Lakes, Appendix F Terrestrial Ecosystem Analysis (Supplement 2). Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1978b. Environmental Impact Statement, Dickey-Lincoln School Lakes, Appendix G Recreation Resources. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1977d. Environmental Impact Statement, Dickey-Lincoln School Lakes, Appendix J Coordination with Other Agencies and Public Involvement. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1978c. Environmental Impact Statement, Dickey-Lincoln School Lakes, Appendix J Coordination with Other Agencies and Public Involvement (Supplement). Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1977c. Draft Environmental Impact Statement, Dickey-Lincoln School Lakes. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1978d. Dickey - Lincoln School Lakes, Appendix G, Recreation Resources. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1977f. Dickey - Lincoln School Lakes, Maine U.S.A. and Quebec Canada. Waltham, MA.

Department of the Army, New England Division, Corps of Engineers (Corps). 1976b. St. John River Basin Maine, Preliminary Report Main Report. Waltham, MA.

Dumand, P. 1985. Personal Communication. August 22, 1985. Game Warden. State of Maine, Maine Department of Inland Fisheries and Wildlife, Estcourt Station, ME.

Edelson, Naomi A. 1985. Personal Communication. August 8, 1985. State of Maine, State Planning Office, Critical Areas Program. Augusta, ME.

Environmental Research and Technology, Inc. (ERT). 1977. Terrestrial Ecosystem Analysis, Dickey-Lincoln School Lakes Project, Maine. Concord, MA.

Everhart, W.H. 1976. "Fishes of Maine," Maine Fish and Wildlife. Maine Fish and Wildlife Department. Augusta, ME.

Everhart, W.H. 1976. Fishes of Maine. Maine Department of Inland Fisheries and Wildlife. Augusta, ME.

Foye, R.E. 1968. "Maine's Warm-water Fishery Resources," Maine Fish and Game. Maine Department of Inland Fisheries and Game. Augusta, ME.

Gagnon, Sally. 1985. Personal Communication. July 19, 1985. State of Maine, Planning Office. Augusta, ME.

Gawler, Susan C. et al. 1984. An Annotated List of Maine's Rare Vascular Plants. State of Maine, Planning Office, Critical Areas Program. Augusta, ME.

Gilcreast, Beverly. 1985. Personal Communication. July 19, 1985. State of Maine, Planning Office. Augusta, ME.

Hancock, William. 1985. Personal Communication. July 16, 1985. Maine Audubon Society. Falmouth, ME.

Heritage Conservation and Recreation Service. 1985. Personal Communication. July 25, 1985. Philadelphia, PA.

Hunt, Chris. 1985. Personal Communication. July 25, 1985. Maine State Switchboard Tourism Department. Augusta, ME.

Hutchinson, Alan. 1976. 1976 Deer Wintering Habitat Survey of the St. John River - Dickey-Lincoln Project Area. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

Johnston, Robert A. 1985. Fresh-Water Wetlands Maps Index. State of Maine, Department of Conservation, Maine Geological Survey. Augusta, ME.

Jordan, R.M. 1977. "Atlantic Salmon Fishing in Maine," Maine Fish and Wildlife. Maine Department of Inland Fisheries and Wildlife. Augusta, ME.

Kranish, Michael. 1985. "Progress seen in the race to save Maine's blad eagles." Boston Sunday Globe. June 23, 1985. Boston, MA.

Long, Robert. Personal Communication. July 16, 1985. State of Maine, Department of Conservation, Division of Forestry Management. Presque Isle, ME.

Maine Atlantic Sea Run Salmon Commission. 1985. Atlantic Salmon Fishing Regulations. Bangor, ME.

Maine, State of, Bureau of Parks and Recreation, Department of Conservation (ME). Undated a. Allagash Wilderness Waterway. Augusta, ME.

Maine, State of, Department of Conservation, Bureau of Parks and Recreation. 1985a. Personal Communication. July 16 and 25, 1985. Augusta, ME.

Maine, State of, Department of Conservation, Geological Survey (ME). 1985b. Personal Communication. July 16, 18 and 19, 1985. Augusta, ME.

Maine, State of, Department of Environmental Protection, Bureau of Land Quality (ME). 1985c. Personal Communication. July 15, 1985. Augusta, ME.

Maine, State of, Department of Environmental Protection, Bureau of Water Quality Control (ME). 1984a. Maine Water Pollution Control Law. Augusta, ME.

Maine, State of, Department of Inland Fisheries and Wildlife. 1985d. Recreation Data and Information. Ashland, ME.

Maine, State of, Department of Conservation, Bureau of Parks and Recreation (ME). 1977a. Maine Comprehensive Outdoor Recreation Plan. Augusta, ME.

Maine, State of, Department of Inland Fisheries and Wildlife (ME). 1985e. Maine Hunting and Trapping Regulations Summary, 1984-1985. Augusta, ME.

Maine, State of, Department of Conservation, Maine Geological Survey. 1985f. Personal Communication. July 22, 1985. Augusta, ME.

Maine, State of, Department of Conservation, Maine Geological Survey. Publications - Maps. 1985g. Augusta, ME.

Maine, State of, Department of Inland Fisheries and Wildlife (ME). 1984b. Inland Ice Fishing Regulations for the 1984-1985 Ice Fishing Season. Augusta, ME.

Maine, State of, Department of Inland Fisheries and Wildlife (ME). 1984c. Wildlife Division Research and Management Report 1983-84. Augusta, ME.

Maine, State of, Department of Inland Fisheries and Wildlife (ME). 1976a. Maine's Wildlife Management Program. Augusta, ME.

Maine, State of, Department of Inland Fisheries and Wildlife (ME). 1985h. Open Water Fishing Regulations 1985. Augusta, ME.

Maine, State of, Department of Inland Fisheries and Wildlife, Fishery Research and Management Division, (ME). 1983a. Maine Lakes Index and Order Form of Lake Surveys Completed Through 1983. Augusta, ME.

Maine, State of, Department of Inland Fisheries and Wildlife (ME). 1977b. Maine's Inland Fisheries Management Program. Augusta, ME.

Maine, State of, Department of Conservation and Bureau of Parks and Recreation (ME). 1977c. Maine Comprehensive Outdoor Recreation Plan. Augusta, ME.

Maine, State of, Division of Inland Fisheries and Wildlife, Information and Education Division. 1985i. Personal Communication. July 16, 1985. Augusta, ME.

Maine, State of, Division of Inland Fisheries and Wildlife, Information and Education Division. 1985j. Personal Communication. July 22, 1985. Augusta, ME.

Maine, State of, Division of Inland Fisheries and Wildlife (ME). 1973. Maine's Fishery Regions: Fish River Lakes. Augusta, ME.

Maine, State of, Division of Inland Fisheries and Wildlife, Wildlife Division (ME). 1983b. Research and Management Report 1983-84. Augusta, ME.

Maine, State of, Executive Department, State Planning Office. 1985k. Personal Communication. July 23, 1985. Augusta, ME.

Maine, State of, Fishery Research and Management Division (ME). 1981. "Guidelines to Fish Stocking in Maine," Maine Fish and Wildlife. Maine Fish and Game Department. Augusta, ME.

Maine, State of, Greater Portland Council of Governments (ME). 1976b. All Land is Not Created Equal, A Handbook for the Protection of Environmentally Sensitive Lands. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1969a. Lake Survey - Bennett Lake. Augusta, ME.

Maine, State of, Land Use Regulatory Commission. 1985l. Land Use Guidance Maps. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1959a. Lake Survey - Packard Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1956a. Lake Survey - Whitehead Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1963. Lake Survey - Drews Lake (Meduxnekeag Lake). Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1969b. Lake Survey - Nickerson Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1977d. Lake Survey - Rideout Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1956b. Lake Survey - Bradbury Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1952. Lake Survey - Cochrane Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1969c. Lake Survey - Deep Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1979a. Lake Survey - Gentle Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1965. Lake Survey - Gould Pond. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1958a. Lake Survey - Green Pond. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1959b. Lake Survey - Jewell Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1956c. Lake Survey - Long Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1958b. Lake Survey - Mud Pond. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1954a. Lake Survey - Portland Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1964. Lake Survey - Depot Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1976c. Lake Survey - St. Froid Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1976d. Lake Survey - Square Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1958c. Lake Survey - Portage Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1976e. Lake Survey - Long Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1976f. Lake Survey - Fish River Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1977e. Lake Survey - Eagle Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1953. Lake Survey - Mud Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1954c. Lake Survey - Togue Pond. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1969d. Lake Survey - Gardner Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1954b. Lake Survey - Black Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1969c. Lake Survey - Deboullie Lake. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Game (ME). 1969f. Lake Survey - Pushineer Pond. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Wildlife (ME). Undated b. Maine Freshwater Fishing. Augusta, ME.

Maine, State of, Maine Department of Inland Fisheries and Wildlife (ME). 1972. Manual for Maine Wetlands Inventory. Augusta, ME.

Maine, State of, Planning Office, Maine Land and Water Resources Council (ME). 1979b. Growth Management in Maine. Augusta, ME.

Maine, State of, Planning Office (ME). 1979c. Handbook of Land Use and Growth Controls, A Guide to Decision Making. Augusta, ME.

Maine, State of, Planning Office (ME). 1974. Land Cover Coding Manual. Augusta, ME.

Maine, State of, Planning Office, Technical Services Division (ME). 1978a. Standard Classification System for Land Use Coding in Maine. Augusta, ME.

Maine, State of, Planning Office, Environmental Planning Center (ME). 1979d. Maine Directory of Natural Resource Organizations. Augusta, ME.

Maine, State of, Planning Office Executive Department (ME). 1975a. Management of Water and Related Land Resources in the State of Maine. New England River Basins Commission. Augusta, me.

Maine, State of, Planning Office Technical Services Division (ME). 1978b. Standard Classification System for Land Use Coding in Maine. Augusta, ME.

Maine, State of, Planning Office, Critical Areas Program (ME). Undated c. C.A.P. (Critical Areas Program) Data Classification. Augusta, ME.

Maine, State of, Planning Office, Critical Areas Program (ME). 1975b. Maine's Critical Areas Program. Augusta, ME.

Maine, State of, Planning Office, Critical Areas Program (ME). 1980. Maine's Critical Areas Program 1980 Report. Augusta, ME.

Maine, State of, Planning Office, Critical Areas Program (ME). 1982. Critical Areas Program List of Publications 1975-1982. Augusta, ME.

Maine, State of, Planning Office, Critical Areas Program (ME). 1985m. A Compilation of the Critical Areas Program Botanical Fact Sheets. Augusta, ME.

Maine, State of, Publicity Bureau and Maine Campground Owners Association (ME). 1985n. 1985 Maine Camping Guide, A Directory of Maine's Great Camping Areas. Augusta, ME.

Maine, State of, State Planning Office and New England River Basins Commission (ME). 1975c. Management of Water and Related Land Resources in the State of Maine. Augusta, ME.

Martin, William H. 1972. "The Pittman - Robertson Program in Maine, Where Has it Been/What has it Done?" Maine Fish and Game. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

McLane, A. J., ed. 1974. McLane's New Standard Fishing Encyclopedia and International Angling Guide. New York: Holt, Rinehart and Winston. New York, NY.

National Park Service. 1985. Personal Communication. July 25, 1985. Bar Harbor, ME.

New England River Basins Commission. 1981a. St. John River Basin Overview Public Review Draft. Boston, MA.

New England River Basins Commission (NERBC). 1981b. St. John River Basin Overview. Boston, MA.

Nickle, Kay. 1985. Personal Communication. July 15, 1985. Soil Conservation Commission. Freeport, ME.

Northern Maine Regional Planning Commission (NMRPC). 1976a. Northern Maine Regional Land Use Element. Caribou, ME.

Northern Maine Regional Planning Commission (NMRPC). 1980a. Northern Maine Regional Recreation Inventory and Analysis June 1980. Caribou, ME.

Northern Maine Regional Planning Commission and Northern Maine Economic Development District (NMRPC). 1984. Northern Maine Overall Economic Development Program - Comprehensive Economic Development Strategy Update. Caribou, ME.

Northern Maine Regional Planning Commission (NMRPC). 1977a. Aroostook Prestile Areawide Water Quality Plan. Caribou, ME.

Northern Maine Regional Planning Commission (NMRPC). 1980b. Northern Maine Growth and Development Strategy. Caribou, ME.

Northern Maine Regional Planning Commission (NMRPC). 1977b. Northern Maine Regional Land Use Element. Caribou, ME.

Northern Maine Regional Planning Commission (NMRPC). 1976b. St. John River Basin Water Quality Management Plan. Caribou, ME.

Northern Maine Regional Planning Commission (NMRPC). 1975. Northern Maine Land Use Map. Caribou, ME.

Owen, Ray B., Jr. and Charles S. Todd. 1978. "Maine Status Update, The Endangered Bald Eagle." Maine Fish and Wildlife. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

Palmer, R.S. 1949. "Maine Birds." Bull. MUS. Comparative Zoology - Volume 102. Harvard University. Cambridge, MA.

Parks, Richard B. 1965. "Upland Game Birds." Maine Fish and Game. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

Ramey, Delbert. 1985. Personal Communication. July 18, 1985. State of Maine, Department of Conservation, Bureau of Public Lands, Regional Manager. Presque Isle, ME.

Richards, C. 1985. Personal Communication. August 22, 1985. Game Warden. State of Maine, Maine Department of Inland Fisheries and Wildlife, Fort Kent, ME.

Ruos, James. 1985. Personal Communication. July 25, 1985. Migratory Bird Office. Washington, DC.

Saint John River Basin Board. 1973. Fishes of the Upper and Middle Saint John River (Report No. 7c). Fredericton, New Brunswick, Canada.

Sheldon, William G. 1972. "Wildlife Dynamics." Maine Fish and Game. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

Sirois, R. 1985. Personal Communication. August 22, 1985. Game Warden. State of Maine, Maine Department of Inland Fisheries and Wildlife, St. Pamphile, P.Q., CANADA.

Smart, Myron. 1967. "Trapping Tips." Maine Fish and Game. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

St. John - Aroostock RC & D. 1984. Forestry Plan of Work for the St. John-Aroostock RC & D Area. Presque Isle, ME.

Stadler, Mark. 1985. Personal Communication. August 13, 1985. State of Maine, Department of Inland Fisheries and Wildlife, Regional Wildlife Biologist. Ashland, ME.

Stephenson, William E. 1985. Personal Communication. July 16 and 18, 1985. Northern Maine Regional Planning Commission and Northern Maine Economic Development District, Assistant Director. Caribou, ME.

Stewart, R.E. and J.S. Aldrich. 1952. "Ecological Studies of Breeding Bird Populations In Northern Maine." Ecology. Volume 33.

Tomey, David. 1985. Personal Communication. July 11 and 24, 1985. Department of the Army, New England Division, Corps of Engineers. Waltham, MA.

Tyler, Hank. 1985. Personal Communication. July 11, 1985. State of Maine, Planning Office, Natural Resources Division, Director Critical Areas Program. Augusta, ME.

U.S. Department of Agriculture, Soil Conservation Service. 1985. Personal Communication. July 16, 1985. Fort Kent, ME.

U.S. Department of the Interior. Geological Survey. 1982a. Bedrock Geology Map No. 1. Augusta, ME.

U.S. Department of the Interior. Geological Survey. 1982b. Bedrock Geology Map No. 2. Augusta, ME.

U.S. Department of the Interior. Geological Survey. 1982c. Bedrock Geology Map No. 3. Augusta, ME.

U.S. Department of the Interior. Geological Survey. 1982d. Bedrock Geology Map No. 4. Augusta, ME.

U.S. Fish and Wildlife Service, Region 5 (USFWS). 1984. Environmental Impact Statement, Draft, Restoration of Atlantic Salmon to New England Rivers. Newton Corner, MA.

Warner, Elizabeth. Personal Communication. July 16 and 18, 1985. State of Maine, Department of Conservation, Keep Maine Scenic Committee. Augusta, ME.

Warner, K. 1966. "Maine Rivers: The Fish River Drainage," Maine Fish and Game. Maine Fish and Game Department. Augusta, ME.

Warner, K. 1969-1970. "The Landlocked Salmon," Maine Fish and Wildlife. Maine Fish and Wildlife Department. Augusta, ME.

Warner, K. 1965. Fish Management in the Fish River Drainage. Fishery Research Bulletin No. 6. Maine Department of Inland Fisheries and Game. Augusta, ME.

Warner, K. and P.M. Bourque. 1980. "Save the Allagash," Maine Fish and Wildlife, Maine Fish and Game Department. Augusta, ME.

Wight, Eric T. 1970. "Beaver Trappers - They're Alive and Well in Maine." Maine Fish and Game. State of Maine, Department of Inland Fisheries and Wildlife. Augusta, ME.

Wommack, Kent. 1985. Personal Communication. July 16, 1985. Nature Conservancy. Brunswick, ME.

APPENDIX A

CRITICAL AREAS PROGRAM

OVERVIEW

In order to include the proper identification and assessment of critical areas in planning activities the Maine State Legislature passed an act in 1974 establishing a state register of critical areas. Under this legislation the Office of Planning developed the Critical Areas Program to identify, document and encourage the conservation of critical areas. The program consists of two phases: registration and conservation (ME, 1975).

Critical areas are officially recognized areas which contain natural features of significance in the state such as: exceptional plant or animal habitat, areas of great geologic or historical interest, and outstanding scenic areas. The registration process involves the identification of these areas, and establishes a priority as to which areas will be investigated first. Subsequently, a planning report is prepared on the proposed critical area and reviewed by the Critical Areas Advisory Board. If a preliminary decision is made that the area should be included on the state register then the property owner is notified and given a 60 day time period to express sentiments regarding the classification. At the end of this time period the board reviews any responses and decides whether or not to classify the area as critical. Initial efforts by the Critical Areas Program have focused on the identification of critical areas throughout the state.

Once an area has been classified efforts are undertaken to develop a conservation program for the area. Conservation may take the form of management agreements with the owner, or the purchase or donation of property rights. In order to protect the landowner's rights, and to prevent damage to critical areas wide dissemination of information on critical areas is not encouraged (ME, 1975).

Since its conception the Critical Areas Program has undergone a number of changes. In 1980 an amendment was passed which states that the Critical Areas Program is not in any sense regulatory and emphasizes that its objective is to work on a voluntary basis with landowners or cooperative conservation efforts. In addition, to avoid duplicating the efforts of other state agencies (e.g., the Maine Historic Preservation Commission), the program no longer includes areas of historic interest (ME, 1980).

TOPOGRAPHY AND GEOLOGY

As part of the Critical Areas Program (see Section 3.4) the State Office of Planning has identified natural features of concern. The following geological subjects are included in the C.A.P. Data Classification:

- o Glacial Features
  - Deltas
  - Eskers
  - Moraines
  - Drumlins
  - Kettleholes
  - Cirques
  - Kames
  - Polishing Striations
- o Shoreline Geomorphology
  - Sand Beaches
  - Cobble Beaches
  - Boulder Beaches
  - Sea Cliffs
  - Wave Cut Beaches/Caves/ Rock Arches
- o Hydrologic Features
  - Whitewater Rapids
  - Waterfalls
  - Gorges
  - River Segments
  - Reversing Falls
- o Bedrock Features
  - Multiple Deformations
  - Fossil Localities
  - Minerals
  - Contact Zones
  - Compositional Layering
  - Metavolcanics
  - Geologic Formations (ME, 1985).

VEGETATIVE COMMUNITIES

The Critical Areas Program has identified three vegetative communities as part of its data classification program:

- Arctic and Alpine Vegetation
  - Sedge meadow
  - Dwarf shrub heath
  - Alpine bog
  - Diapensia heath
  - Low elevation cliff
- Wetland Communities
  - Salt marsh
  - Inland freshwater marsh
  - Conifer swamps (black spruce, cedar, etc.)
  - Hardwood swamps
  - Coastal raised peatlands
  - Inland raised peatlands
  - Inland flat peatlands/kettleholes
  - Calcareous bogs
  - Freshwater aquatic
  - Intertidal
- Forest Communities
  - Northern hardwood
  - Red oak
  - Pitch pine plains
  - Spruce/Fir
  - White pine
  - Hemlock
  - Hickory

(ME, 1975b)

APPENDIX B

NEW ENGLAND REGIONAL HERITAGE PROGRAM

NATURAL COMMUNITIES

For the purposes of this classification, a natural community is a distinct and recurring collection of plants and animals naturally associated with each other and their physical environment. This system identifies seven major types of natural communities:

- Marine Communities

The ocean littoral zone from mean high water to seaward limits or rooted vascular vegetation.

- Estuarine Communities

The natural aquatic or wetland habitats from the upstream limits of tidal influence to the mouth of a bay, river, or other estuary, and including all areas below the mean high water.

- Lacustrine Communities

The lentic waters of natural topographic depressions lacking persistent emergent vegetation, except around the perimeter.

- Riverine Communities

The natural lotic waters from the source of origin downstream to the limits of tidal influence, and bounded by the channel bank.

- Palustrine Communities

Nontidal perennial wetlands characterized by emergent vegetation.

- Terrestrial Communities

Above ground areas lacking perennial wetlands or standing water.

- Subterranean Communities

All areas below ground. (ME, Undated c)

APPENDIX C

WETLAND TYPES

Inland Freshwater Wetlands are wetlands which are influenced by fresh nontidal water. These wetlands are flat areas filled with waterlogged soils which are regularly or permantly flooded by up to three feet of fresh water. Typical vegetation is grasses, shrubs, sedges, rushes, tamaracks, black spruce, balsam firs, red maple, and black ash. In drier areas alder, willow, and dogwood can be found to be predominant (ME, 1972). These wetland categories are defined in detail below:

o Seasonally Flooded Basins or Flats (Type 1)

These flats occur in upland depressions and along river courses where flooding occurs from heavy rain and snow run-off in late fall, winter or spring. The soil is generally saturated, although well drained during the growing season. The predominant vegetation is herbaceous such as grasses, sedges and rushes.

o Inland Fresh Meadow (Type 2)

These meadows are found in shallow lake basins or potholes, and bordering the landward side of shallow marshes. The soil is waterlogged to within a few inches of the surface during the growing season. Typical vegetation includes aquatic grasses, sedges and rushes.

o Inland Shallow Fresh Marsh (Type 3)

These marshes may almost fill shallow lake basins or potholes, or border the landward side of deep fresh marshes. The soil is waterlogged during the growing season, being flooded at times with as much as six inches of water. Characteristic vegetation in northern regions are plume grass, rice cutgrass, carex, and giant burreed. Cattails, arrowheads, pickerel weed and smartweed may also be found. Hummocks are common to these areas in contrast with inland deep fresh marshes.

o Inland Deep Fresh Marsh (Type 4)

These marshes are found in shallow lake basins and potholes, or bordering open water occurring in such areas. Six inches to three feet of water covers the soils during the growing season. The vegetation is interspersed with open water and is made up mainly of cattails, plume grass, spikerushes, wild rice, pondweeds, duckweeds, coontail, and spatterdock.

o Shrub Swamp (Type 6)

Shrub swamps are found along sluggish streams. The soil is waterlogged but could be covered with at least a foot of water. On the drier soils alder and dogwood are predominant. Willow, buttonbush, and sweet gale are found on the wetter sites.

- Wooded Swamp (Type 7)

These swamps are found along sluggish streams, on flat uplands, and in shallow low basins and potholes. The soil is waterlogged but may be covered by at least a foot of water during the wet seasons. The northern wooded swamps contain tamarack, black spruce, balsam fir, alder, red maple, and black ash. The coniferous wooded swamps also usually have a thick covering of mosses. The deciduous swamps support duckweeds, smartweeds, and other herbaceous vegetation.

- Bog (Type 8)

Bogs are found in shallow lake basins, and potholes, along sluggish streams, and on flat uplands. The soil is saturated and covered with mosses or other plant material. The vegetation may be woody, herbaceous and interspersed with open water. The northern vegetation includes Labrador-tea, leather-leaf, cranberries, carex, cottongrass, sweetgale and sphagnum moss. Occasionally stunted black spruce and tamarack may occur.

APPENDIX D

WILDLIFE SPECIES OF NORTHERN MAINE

MAMMALIAN SPECIES OF NORTHERN MAINE
(Adapted from ERT, 1977; Corps, 1982; Corps, 1977d)

Scientific Name	Common Name
Masked shrew	Sorex cinereus
Shorttail shrew	Blarina brevicauda
Starnose mole	Condylura cristata
Keen myotis	Myotis keeni
Eastern pipistrel	Pipistrellus subflavus
Big brown bat	Eptesicus fuscus
Raccoon	Procyon lotor
Longtail weasel	Mustela frenata
Mink	Mustela vison
Striped skunk	Mephitis mephitis
Woodchuck	Marmota monax
Eastern chipmunk	Tamias striatus
Eastern gray squirrel	Sciurus carolinensis
Meadow vole	Microtus pennsylvanicus
Muskrat	Ondatra zibethica
Norway rat	Rattus norvegicus
House mouse	Mus musculus
White-footed mouse	Peromyscys leucopus
Meadow jumping mouse	Zapus hudsonius
White-tailed deer	Odocoileus virginianus
Little brown bat	Myotis lucifugus
Red bat	Lasiurus borealis
Small-footed bat	Myotis sublatus
Hoary bat	Lasiurus cinereus
Silver haired bat	Lasionycleris noctivagans
Beaver	Castor canadensis
Black bear	Ursus americanus
Bobcat	Lynx rufus
Coyote	Canis latrans
Red fox	Vulpes vulpes
Fisher	Martes pennanti
Porcupine	Erethizon dorsatum
River otter	Lutra canadensis
Snowshoe hare	Lepus americanus
Red squirrel	Tamiasciurus hudsonicus
Shorttail weasal	Mustela erminea
N. flying squirrel	Glaucomys sabrinus
Deer mouse	Peromyscus maniculatus
Smoky shrew	Sorex fumeus
Longtail shrew	Sorex dispar
Northern water shrew	Sorex palustris
Artic shrew	Sorex arcticus
Pigmy shrew	Microsorex hoyi
Hairytail mole	Parascalops breweri
Pine marten	Martes americana
Canada lynx	Lynx canadensis
Southern bog lemming	Synaptomys cooperi
Northern bog lemming	Synaptomys borealis
Boreal redback vole	Clethrionomys gapperi
Woodland jumping mouse	Napaeozapus insignis
Moose	Alces alces

REPTILE AND AMPHIBIAN SPECIES OF NORTHERN MAINE
(Adapted from ERT, 1977; Corps, 1982; Corps, 1977d)

Scientific Name	Common Name
Mink frog	Rana septentrionalis
Northern leopard frog	Rana pipiens pipiens
Pickerel frog	Rana palustris
Wood frog	Rana sylvatica
Green frog	Rana clamitans melanota
Bull frog	Rana catesbeiana
Northern spring peeper	Hyla crucifer
Eastern gray tree frog	Hyla versicolor
American toad	Bufo americanus
Red-spotted newt	Notophthalmus viridescens
Spotted salamander	Ambystoma maculatum
Blue-spotted salamander	Ambystoma laterale
Northern dusky salamander	Desmongnathus fuscus
Northern spring salamander	Gyrinophilus porphyriticus
Northern two-lined salamander	Eurycea bislineata
Red-backed salamander	Plethodon cinereus
Four-toed salamander	Hemidactylium scutatum
Common snapping turtle	Chelydra serpentina
Wood turtle	Clemmys insculpta
Eastern painted turtle	Chrysemys picta picta
Midland painted turtle	Chrysemys picta marginata
Northern red-bellied snake	Storeria occipitomaculata
Northern brown snake	Storeria dekayi
Northern water snake	Natrix sipedon
Northern ringneck snake	Diadophis punctatus
Northern black racers	Coluber constrictor
Eastern garter snake	Thamnophis sirtalis
Eastern ribbon snake	Thamnophis sauritus
Eastern green snake	Opheodrys vernalis
Eastern milk snake	Lampropeltis doliata triangulum

BIRD SPECIES OF NORTHERN MAINE
(Adapted From ERT, 1977; Corps, 1982; Corps, 1977d)

Common Name	Scientific Name
Alder flycatcher	Empidonax alnorum
American bittern	Botaurus lentiginosus
American goldfinch	Carduelis tristis
American kestrel, Sparrow hawk	Falco sparverius
American redstart	Setophaga ruticilla
American robin	Turdus migratorius
American woodcock	Philohela minor
Bald eagle	Haliaeetus leucocephalus
Bank swallow	Riparia riparia
Barn swallow	Hirundo rustica
Barred owl	Strix varia
Bay-breasted warbler	Dendroica castenea
Belted kingfisher	Megaceryle alcyon
Black and White warbler	Mniotilta varia
Black duck	Anas rubripes
Black-backed three-toed woodpecker	Picoides articus
Black-capped chickadee	Parus atricapillus
Black-crowned night heron	Nycticorax nycticorax
Black-throated blue warbler	Dendroica caetulescens
Black-throated green warbler	Dendroica virens
Blackburnian warbler	Dendroica fusca
Blackpoll warbler	Dendroica striata
Blue jay	Cyanocitta cristata
Blue-winged teal	Anas discors
Bobolink	Dolichonyx oryzivorus
Boreal checkadee	Parus hudsonicus
Boreal owl	Aegolius funereus
Broad-winged hawk	Buteo platypterus
Brown creeper	Certhia familiaris
Brown-headed cowbird	Molothrus ater
Canada warbler	Wilsonia canadensis
Canadian goose	Branta canadensis
Cape May warbler	Dendroica tigrina
Cedar waxwing	Bombycilla cedrorum
Chestnut-sided warbler	Dendroica pensylvanica
Chimney swift	Chaetura pelagica
Chipping sparrow	Spizella passerina
Cliff swallow	Hirundo pyrrhonota
Common crow	Corvus brachyrhynchos
Common flicker	Colaptes auratus
Common goldeneye	Bucephala clangula
Common grackle	Quiscalus quiscula
Common loon	Gavia immer
Common merganser	Mergus merganser
Common nighthawk	Chordeiles minor
Common raven	Corvus coras
Common redpoll	Carduelis flammea
Common snipe	Gallinago gallinago

BIRD SPECIES OF NORTHERN MAINE (Cont'd)
(Adapted From ERT, 1977; Corps, 1982; Corps, 1977d)

Common Name	Scientific Name
Common yellowthroat	Geothlypis trichas
Cooper's hawk	Accipiter cooperii
Dark-eyed junco	Junco hyemalis
Downy woodpecker	Picoides pubescens
Eastern bluebird	Sialia sialis
Eastern kingbird	Tyrannus tyrannus
Eastern meadowlark	Sturnella magna
Eastern phoebe	Sayornis phoebe
Eastern wood pewee	Contopus virens
Evening grosbeak	Coccothraustes vespertinus
Fox sparrow	Passerella iliaca
Golden-crowned kinglet	Regulus satrapa
Goshawk	Accipiter gentilis
Gray catbird	Dumetella carolinensis
Gray jay	Perisoreus canadensis
Gray-cheeked thrush	Catharus minimus
Great blue heron	Ardea herodias
Great horned owl	Bubo virginianus
Greater yellowlegs	Tringa melanoleuca
Green-winged teal	Anas crecca
Hairy woodpecker	Picoides villosus
Hawk owl	Surnia ulula
Hermit thrush	Catharus guttatus
Herring gull	Larus argentatus
Hoary redpoll	Acanthis hornemannii
Hooded merganser	Lophodytes culcullatus
Horned lark	Eremophila alpestris
House sparrow	Passer domesticus
House wren	Troglodytes aedon
Indigo bunting	Passerina cyanea
Killdeer	Charadrius vociferus
Lapland longspur	Caloarius lapponicus
Least flycatcher	Empidonax minimus
Lesser yellowlegs	Tringa flavipes
Loggerhead shrike	Lanius ludovicianus
Long-eared owl	Asio otus
Magnolia warbler	Dendroica magnolia
Mallard	Anas platyrhynchos
Marsh hawk	Circus cyaneus
Merlin	Falco columbarius
Mourning dove	Zenaida macroura
Mourning warbler	Oporornis philadelphia
Nashville warbler	Vermivora ruficapilla
Northern oriole	Icterus galbula
Northern parula Warbler	Parula americana
Northern shrike	Lanius excubitor
Northern three-toed woodpecker	Picoides tridactylus
Northern waterthrush	Seiurus noveboracensis
Olive-sided flycatcher	Contopus borealis

BIRD SPECIES OF NORTHERN MAINE (Cont'd)
(Adapted From ERT, 1977; Corps, 1982; Corps, 1977d)

Common Name	Scientific Name
Osprey	Pandion haliaetus
Ovenbird	Seiurus aurocapillus
Palm warbler	Dendroica palmarum
Peregrine falcon	Falco peregrinus
Philadelphia vireo	Vireo philadelphicus
Pied-billed grebe	Podilymbus podiceps
Pileated woodpecker	Dryocopus pileatus
Pine grosbeak	Pinicola enucleator
Pine siskin	Carduelis pinus
Purple finch	Carpodacus purpureus
Purple martin	Progne subis
Red crossbill	Loxia curvirostra
Red-breasted merganser	Mergus serrator
Red-breasted nuthatch	Sitta canadensis
Red-eyed vireo	Vireo olivaceus
Red-shouldered hawk	Buteo lineatus
Red-tailed hawk	Buteo jamaicensis
Red-winged blackbird	Agelaius phoeniceus
Ring-necked duck	Aythya collaris
Rock Dove, pigeon	Columba livia
Rose-breasted grosbeak	Pheucticus ludovicianus
Ruby-crowned kinglet	Regulus calendula
Ruby-throated hummingbird	Archilochus colubris
Ruffed grouse	Bonasa umbellus
Rusty blackbird	Euphagus carolinus
Savannah sparrow	Passerculus sandwichensis
Saw-whet owl	Aegolius acadicus
Screech owl	Otus asio
Sharp-shinned hawk	Accipiter striatus
Sharp-tailed sparrow	Ammodramus caudacutus
Short-eared owl	Asio flammeus
Snow bunting	Plectrophenax nivalis
Snowy owl	Nyctea scandiaca
Solitary sandpiper	Tringa solitaria
Solitary vireo	Vireo solitarius
Song sparrow	Melospiza melodia
Sora	Porzana carolina
Spotted sandpiper	Actitis macularia
Spruce grouse	Canachites canadensis
Starling	Sturnus vulgaris
Swainson's thrush	Catharus ustulatus
Swamp sparrow	Melospiza georgiana
Tennessee warbler	Vermivora peregrina
Tree sparrow	Spizella arborea
Tree swallow	Iridoprocne bicolor
Veery	Catharus fuscescens
Vesper sparrow	Pooecetes gramineus
Warbling vireo	Vireo gilvus
Water pipit	Anthus spinoletta

BIRD SPECIES OF NORTHERN MAINE (Cont'd)
(Adapted From ERT, 1977; Corps, 1982; Corps, 1977d)

Common Name	Scientific Name
Whip-poor-will	*Caprimulgus vociferus*
White-breasted nuthatch	*Sitta carolinensis*
White-throated sparrow	*Zonotrichia albicollis*
White-winged crossbill	*Loxia leucoptera*
Wilson's warbler	*Wilsonia pusilla*
Winter wren	*Troglodytes troglodytes*
Wood duck	*Aix sponsa*
Wood thrush	*Hylocichla mustelina*
Yellow warbler	*Dendroica petechia*
Yellow-bellied flycatcher	*Empidonax flaviventris*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-rumped warbler	*Dendroica coronata*

APPENDIX E

HUNTING AND TRAPPING PRACTICES

Important rules and regulations governing hunting and trapping in the State of Maine are summarized in "Maine Hunting and Trapping Regulations Summary 1984 - 1985" and "Migratory Game Bird Hunting Schedule 1984." Copies of these regulations are included in accompanying materials. These regulations denote species which may be hunted or trapped, general seasons, legal methods, limits, and other restrictions. The accompanying table presents a summary of species which may be hunted and/or trapped. There is no general season on any species which is not listed on this table. All of these game species and other wildlife species may be found within the project area.

Big Game Species

White-tailed deer may be hunted during the special archery season from October 1 to October 26 or during the regular firearm season from October 29 to November 24. In addition, there is a firearms day for Maine residents only on the Saturday before the regular season. Within the project area, deer of either sex may be taken throughout the season. Only one deer per person may be taken annually. Moose hunting is allowed by permit only. A lottery drawing will be held in the spring which limits the number of hunters and therefore moose which may be taken each year. In 1983 and 1984 1,000 permits (900 for residents and 100 for nonresidents) were given by public lottery. Moose season was restricted to a seven day period in the fall. In 1984 the season extended from October 8 to October 13. Black bear may be hunted from September 1 through November 30 and trapped from September 1 through October 31. Only one bear may be taken per person per year (ME, 1985e).

Upland Game Species

The hunting season for ruffed grouse and gray squirrels extends from October 1 to November 30. There is daily bag limit of four for these game species. Cottontail rabbits and snowshoe hares may be hunted from October 1 through March 31. They also have a daily bag limit of four. Woodchuck and red squirrel may be hunted throughout the year with no limit on the number taken. Spruce grouse are protected from hunting and there is no open season (ME, 1985e).

Migratory Game Species

There is a comprehensive daily time schedule for the hours at which migratory game species may be hunted during the season. In general, the hunting season for ducks extends from October 1 to November 19 in the project area with a daily bag limit of two to five ducks depending on the species. An

SUMMARY LIST OF WILDLIFE SPECIES
WHICH MAY BE HUNTED AND/OR TRAPPED (ME, 1985e)

Wildlife Species	Hunt	Trap
White-tailed deer	x	
Black bear	x	x
Ruffed grouse	x	
Cottontail rabbit	x	
Snowshoe hare	x	
Red squirrel	x	
Gray squirrel	x	
Raccoon	x	x
Gray fox	x	x
Red fox	x	x
Bobcat	x	x
Coyote	x	x
Skunk	x	x
Woodchuck	x	
Porcupine	x	
Crow	x	
Fisher		x
Marten		x
Weasel		x
Mink		x
Muskrat		x
Otter		x
Beaver		x

exception to this rule is the black duck which is restricted to a daily bag limit of one and which may only be hunted from October 15 to November 19. The hunting season for other waterfowl varies during the time period of September 1 to December 29 with daily bag limits ranging from two to 25 waterfowl depending on the species (ME, 1985e).

Other Wildlife Species

The hunting season for raccoon, fox, bobcat, and skunk varies during the time period of October 20 to Feburary 28 with no limit on the number taken. Coyote, porcupine and red squirrel may be hunted throughout the year with no limit on the number taken. Crow may be hunted during the spring from March 14 to April 30 and in the late summer from July 16 to September 29. There is no daily limit on the number of crow which may be hunted (ME, 1985e).

Bobcat, coyote, fisher, fox, marten, skunk, raccoon, weasel, mink, muskrat and otter may be trapped from October 28 to December 15 in the project area. After November 30 it is illegal to set a trap above ground or snow level. In general, beaver may be trapped from December through February. The trapping season for beaver is contingent upon the number of beaver trapped in each township the preceding year. To maintain populations beaver trapping may be restrcited in some areas. Trapping seasons for each township are set yearly by the Wildlife Management Unit in which the township lies. In additon, muskrat may be trapped during the beaver season as well as the regular season, and otter accidentally trapped during the beaver season may be lawfully possessed (ME, 1985e).

APPENDIX F

FISHING PRACTICES

A summary of the important rules and regulations governing sport fishing in the inland district of the State of Maine is presented in the 1985 Open Water Fishing Regulations and the Inland Ice Fishing Regulations for the 1984-1985 Ice Fishing Season (from ice-in in 1984 through March 31, 1985). Copies of these regulations are included in the accompanying materials. The regulations denote kinds of fish, general seasons, legal methods, minimum length, and daily limit.

In the Fish River drainage basin the open fishing season dates are as follows: brooks and streams, May 1 to September 15, lakes and ponds, May 1 to September 30; and rivers, May 1 to September 15. Special open fishing season rules (ME, 1985h) for the Fish River Chain of Lakes and Fish River drainage basin as a whole are as follows:

- Black Ponds, Denny Pond, Gallilee Pond, Island Pond, North Pond, Stink Pond, Upper Pond - fly fishing only.
- Big Black Lake, Black Lake, Deboullie Lake, Gardner Lake, Pushineer Pond - use or possession of live fish as bait is prohibited.
- Fish River Chain of Lakes (Fish, Portage, St. Froid, Eagle, Square, Cross, Mud, and Long Lakes), thoroughfares connecting these waters, and the Fish River - daily bag and possession limit on salmon, trout, and togue: five fish, not more than two of which may be salmon, not more than two of which may togue; all waters of the Fish River Chain of Lakes, including tributaries and outlets, closed to the taking of smelts except by hook and line. Smelts may be taken by use of three single-baited hooks spaced a minimum of four inches apart; thoroughfares connecting Long, Mud, Cross, Square, Eagle, and St. Froid Lakes are open to fly fishing only from September 16 to September 30 with a daily limit of one fish.
- Black Lake and tributaries and outlet to barrier dam - use or possession of live fish as bait is prohibited; daily limit on trout is five fish.
- First Chase Lake - fishing with artifical lures or worms only; length limit on togue is 16 inches.
- Second and Third Chase Lake - length limit on togue is 16 inches.
- Ferguson Pond - artifical lures only.
- Moccasin Pond - closed to fishing.

In the Fish River drainage basin there is ice fishing on certain lakes and ponds. In Aroostook County, lakes and ponds which are not listed in the regulations (ME, 1984b) are closed to all ice fishing. Special ice fishing rules (ME, 1984b) for the Fish River drainage basin are as follows:

- Carr Pond, Portage Lake, St. Froid Lake - closed to fishing until January 1 and then open to ice fishing for all fish from January 1 through March 31.

- Carr Pond - daily bag limit on salmon, trout and togue: two fish in the aggregate, not to include more than one togue; fishing restricted to two lines per person.

- Cross Lake, Eagle Lake, Long Lake, Square Lake - open to ice fishing for smelts and cusk at night only (1/2 hour after sunset until 1/2 hour before sunrise) from January 1 to January 14; then open to ice fishing for all fish from January 15 to March 15 with night fishing for smelts permitted; smelts may be taken only by hook and line, three hooks per line permitted, hooks to be not less than four inches apart.

- Portage Lake, St. Froid Lake - smelts may be taken only by hook and line; night fishing for smelts permitted; three hooks per line permitted, hooks to be not less than four inches apart.

- Square Lake - two fish daily bag limit in the aggregate of salmon, trout, and togue.

APPENDIX G

STATE RARE SPECIES PROGRAM

The identification and listing of rare species within the State of Maine is an ongoing process. As part of its program to identify and conserve the significant natural features of Maine, the Critical Areas Program has developed the rare plant inventory. The inventory includes the identification of rare plant species, the documentation and registration of rare plant stations, and the study of unusual plant communities.

There are basically five types of rare plants in Maine. These include:

1. Species which are at the geogrphic limit of their range
2. Endemic species which have a very small natural range
3. Species which require a habitat which is scarce in Maine
4. Species which are rare throughout their range
5. Species whose populations are seriously declining (Gawler, et al, 1984).

On the basis of these types of rare species a list of criteria has been developed for listing rare species. The objective of these criteria was to combine the quantitative infrequency of a species with the qualitative perceived value of a species to society into a framework for the evaluation and inclusion on the Maine rare plant list. A complete listing of Maine's rare vascular plants and fact sheets on these plants accompanies this report.

The Critical Areas Program has also identified a number of significant species of wildlife (e.g., aquatic invertebrates, terrestrial invertebrates, cold blooded vertebrates, birds and mammals). Although these species are significant they have not been designated as rare (ME, undatedc).

FEW SMES SNES	1)	species with authenticated herbarium specimens from 10 or fewer Maine towns. ("Town" is used because it is more easily definable than "Station"). Includes FEW -- collected from 2-10 Maine towns or from 2 distinct stations in 1 town, SMES -- known from a single Maine station, and SNES -- known from a single New England station. Example: FEW - Eleocharis rostellata; SMES - Rhododendron lapponicum; SNES - Drosera anglica.
ENME	2)	species which are endemic to Maine. Example: Carex oronensis.
ENNE	3)	species which are endemic to New England. Example: Paronychia argyrocoma var. albimontana.
RSTR	4)	species with a restricted range (approximately the size of New England, but not limited to its boundaries) and which are infrequent, vulnerable, or declining within that range. Example: Polygonum puritanorum.
NLR SLR ELR	5)	species at the northern, southern, or eastern limit of their range in Maine and infrequent in Maine: peripheral species. Example: NLR - Baptisia tinctoria var. crebra; SLR - Erigeron hyssopifolius; ELR - Amelanchier humilis.
FED	6)	species listed, proposed, or currently under review for Threatened of Endangered status by the Office of Endangered Species (U.S. Fish and Wildlife Service, Department of the Interior), based on the most up-to-date list published in the Federal Register (Dec. 15, 1980 at time of this printing). Example: Isotria medeoloides.
DECL VULN DEC/VUL	7)	species which have been seriously declining in number in recent years and/or which are vulnerable to depletion from collecting, destruction of habitat, etc. Example: DECL - Sassafras albidum; VULN - Oxytropis johannensis; DEC/VUL - Gentiana crinita.

LIST OF CRITERIA FOR CLASSIFYING RARE PLANTS
IN MAINE (Gawler, et al, 1984)